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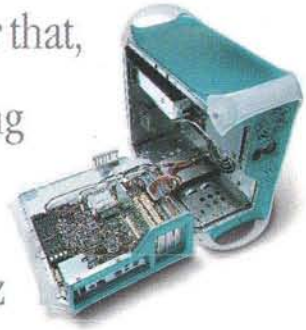
State of the Pentium-crushing art. Chip vs. chip, the G3 has been crushing Pentium processors since the day it was born.* But what about computer vs. computer performance, using demanding applications like Photoshop? Good question. For that, we surrender the podium to what is fast becoming one of our favorite authorities, *PC Magazine*: "The Power Mac™ G3 outperformed the (450MHz Pentium II) PC in 12 of our 13 tests by an average of 35%" and continues to "outperform" even the 500MHz Pentium III, they say. Factor in our built-in 128-bit 3D graphics accelerator, storage up to 100GB, high-speed networking and revolutionary open-door design – and it's an open-and-shut case. Think different.



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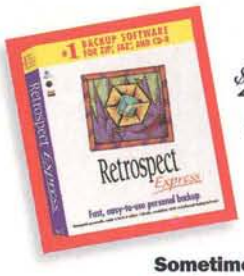

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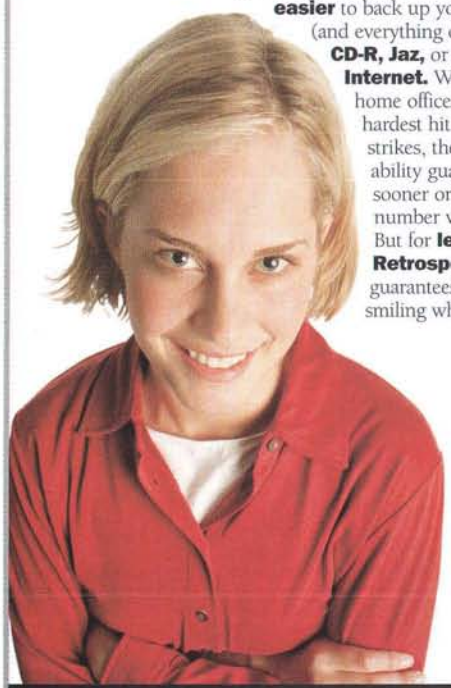

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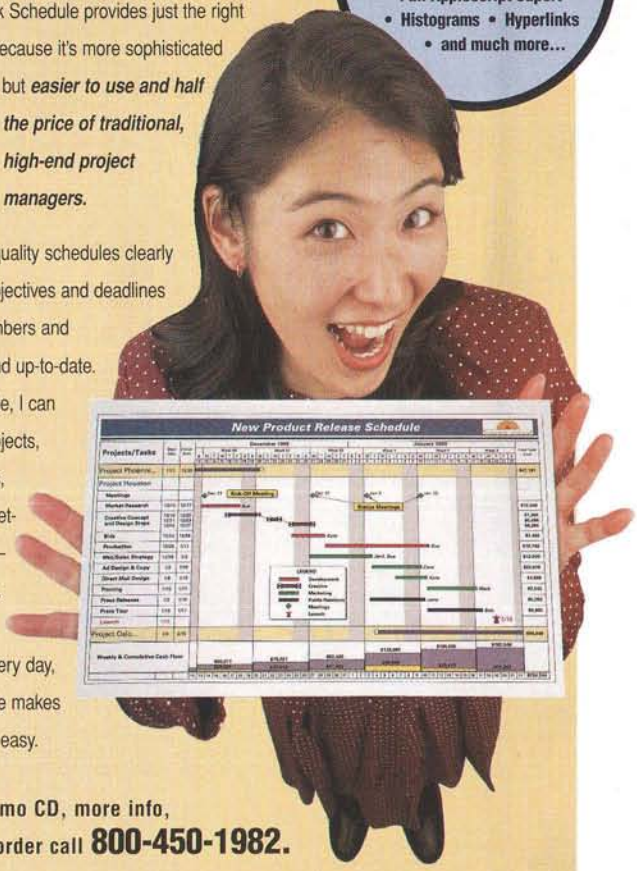

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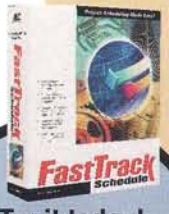

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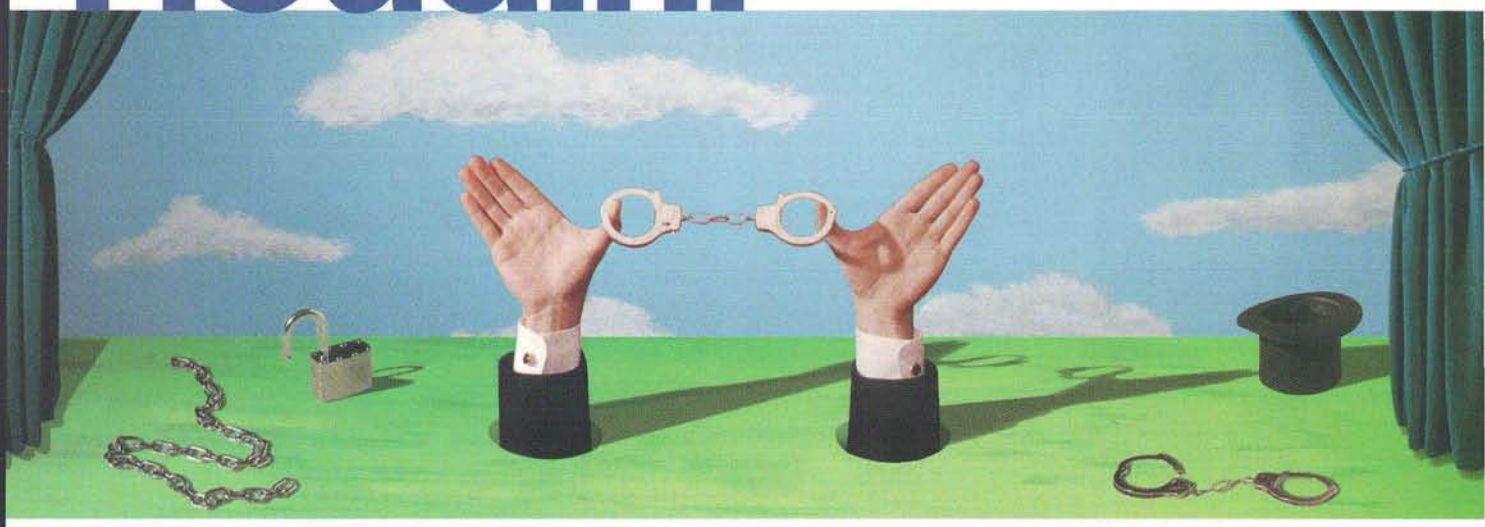

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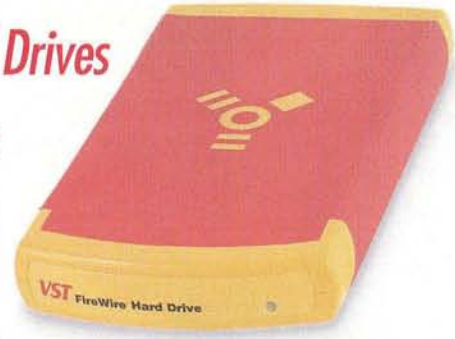

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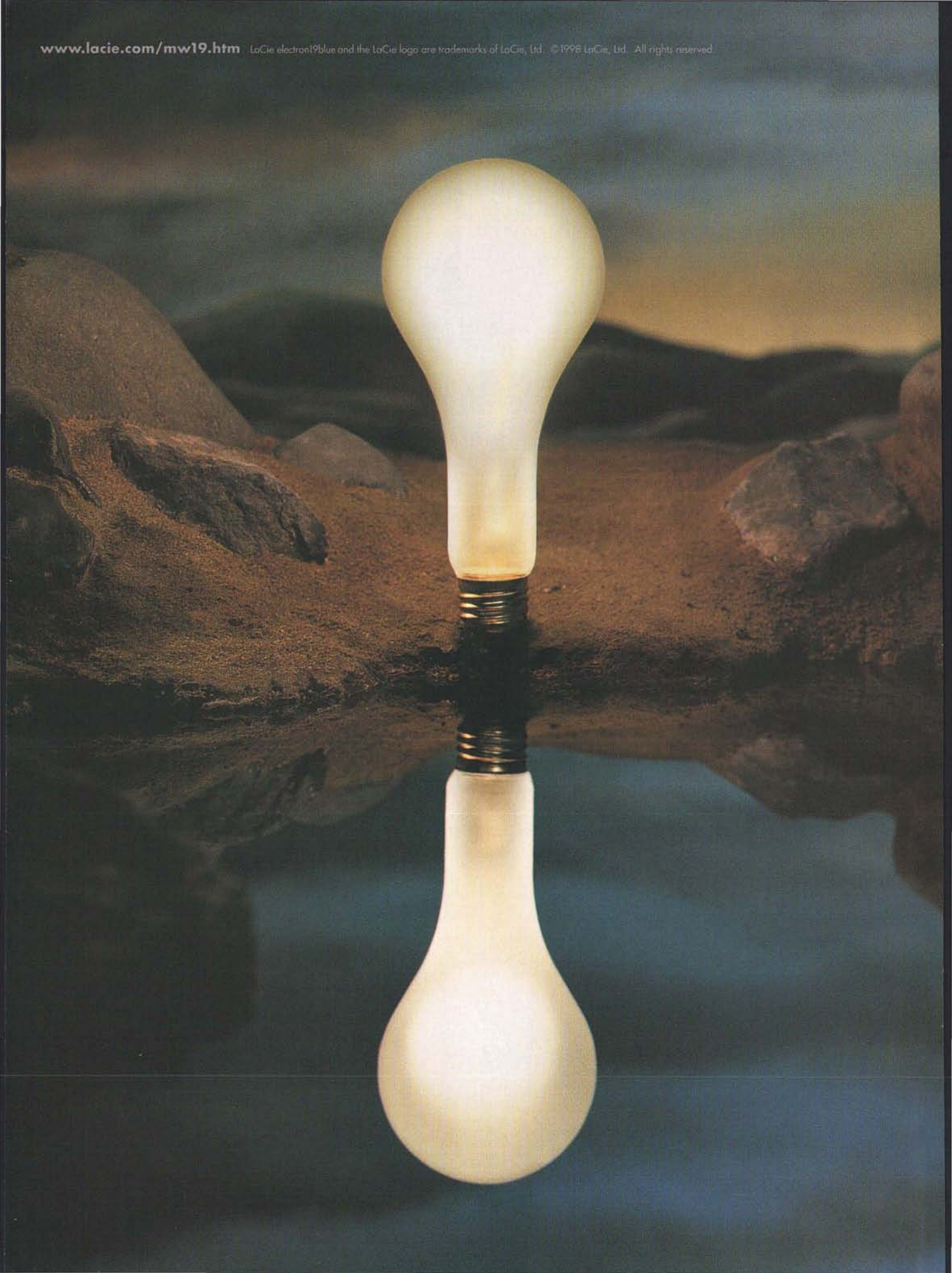
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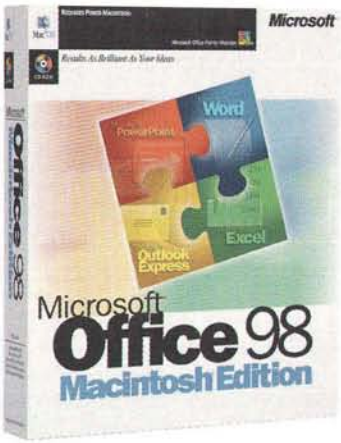

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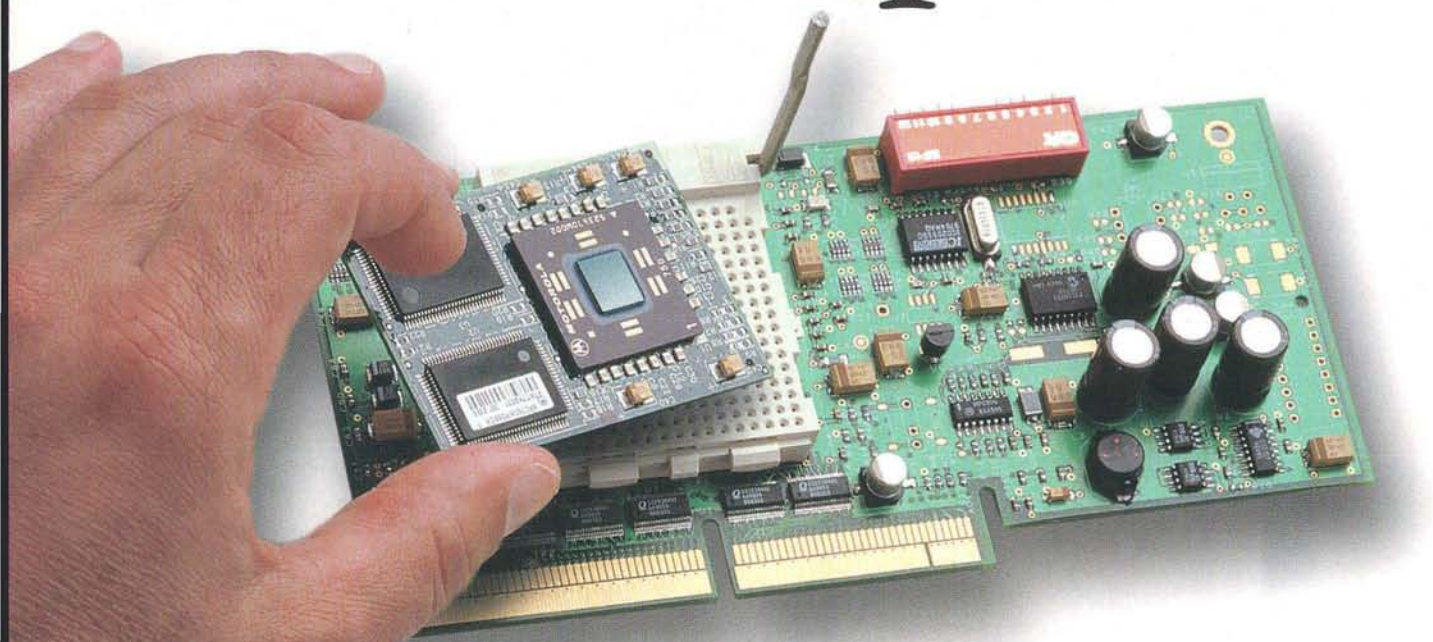

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Letters

DAVE CUTLER

Tales of Web Travelers

IN HER "WEB TRAVELER'S COMPANION" (April 1999), Shelly Brisbin recommended a workday-diversion Web site called the Onion. In viewing this Web site, I was shocked to find that it contained adult-oriented material unsuitable for children. I would appreciate it if in the future *Macworld* would do a better job in reviewing its recommendations and not include material that most people would find offensive and inappropriate.

DAVID MCCOWAN
Lexington, Kentucky

I ENJOYED VISITING THE SITES described in the "Web Traveler's Companion." You emphasized that the Web is worldwide, but unfortunately you provided only American sites. Arguably the best news site in the world is maintained by the British Broadcasting Corporation, at http://news.bbc.co.uk, and contains the same quality of coverage as the BBC's radio and television services. The site provides news, history, analysis, reader feedback, and relevant links and breaks coverage down by continent so that readers may explore their region in depth.

GAGGAN BOPARAI
Pittsburgh, Pennsylvania

I USUALLY AGREE WITH MOST OF the reviews and awards in your magazine, but sorry, *Macworld*, I'm not agreeing this time! In the "Web Traveler's Companion," Shelly Brisbin picked MIT's Info-Mac HyperArchive for best shareware site. I didn't even have it in my bookmarks, so I thought I would check it out. I searched for Flash-It, the screen-capturing software. The MIT site had no clue. I went back to my favorite, ZDNet Macintosh Software Library (www.zdnet.com/mac/download.html), and I found the application on the first try.

MICHAEL SCORZO
DeKalb, Illinois

New Life with Linux

STEPHAN SOMOGYI'S EXCELLENT article about Unix on Macs ("The Beauty of the Beast," April 1999) mentioned that LinuxPPC can make an old Power Mac a great Web server. Older Macs with 68030 and 68040 processors also can take advantage of the OpenBSD operating system. In the small company I recently worked for, we set up a Centris 650 with OpenBSD and Apache and found it very adequate for our Web-service needs. This is not something for the fainthearted, but it's a great way to recycle pre-PowerPC Macs. I have even seen a Mac SE/30 running as a decent FTP server with OpenBSD.

DAVID SIMMONS
Alexandria, Virginia

THANKS FOR A TERRIFIC INTRODUCTORY article about Unix options on the Macintosh. I use LinuxPPC R4 on my Motorola StarMax 3000 and can attest to the extraordinary speedup—booting, starting Netscape Communicator, and doing page layout in Communicator are all at least three times faster than with Mac OS 7.6.1.

But I agree that it is not for everyone. I cannot count the times I was thankful for my ten years of Unix experience. Getting the X Windows graphics system running optimally is tricky, and not all video cards are fully supported by the kernel or X Windows. My MacPicasso 540 video card, for example, does not yet have a valid color map, so applications are quite ugly—although in the spirit of Linux, I am testing and debugging kernel patches to correct this, and the patches will be incorporated into a future Linux release.

The next version of LinuxPPC, called R5, reportedly has significant improvements in installation, as well as the very nice GNOME desktop, which I've used on Linux/Alpha. When it becomes available, please review the upgrade so readers can better evaluate the Linux option.

ADAM CLAYTON POWELL IV
Arlington, Virginia

The Good, the Bad, and the NT

MACWORLD SEEMS TO BELIEVE that Windows NT is superior to the Mac OS ("Put Your Files in the Fast Lane," April 1999).

Time after time the magazine downplays the Mac OS and implies that NT is where we're headed, or where we should be headed. NT is headed downhill.

The inclusion of a Windows NT 5 beta—which probably won't be released for

continues

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another year, if ever—and exclusion of Mac OS X Server was just the latest example of *Macworld*'s obvious bias. The tests showed the current Mac OS superior in file-serving performance, but you almost seemed disappointed that NT didn't win.

Be proud of the Macintosh. Things are only going to get better on the side of the good guys and worse on the side of the "evil empire."

KEN C. SHERMAN
Melbourne, Florida

We did not include Mac OS X Server in the story because it was not shipping at the time, and a public beta was unavailable for our tests. For our assessment of Mac OS X Server, please see this month's Reviews.*—Ed.*

PDF for Presentations

JIM HEID'S ARTICLE "PRESENTING with HTML" (*Create*, April 1999) presents good arguments for using a universal format as a presentation medium, but he promotes the wrong one. Adobe's Portable Document Format (PDF) features all of the same benefits plus some not inherent in HTML—scalability, built-in navigation tools, text search, output to film, and embedded fonts. Plus, any printable file can be converted to PDF with Acrobat PDFWriter or Distiller, and most Adobe products save directly to PDF.

C. SCOTT MILLER
Studio City, California

Surfing with Efficiency

AS I READ JOSEPH SCHORR'S "URL Magic Tricks" (*Secrets*, April 1999), I looked for him to talk about a timesaving trick I use: in addition to my browser's bookmarks, I have hundreds of URLs saved in different ClarisWorks spreadsheets for different topics.

You can collect URLs in spreadsheet files that you might name "www (Some Topic)." For example, in my folder on recreation, I have three spreadsheets: "www Sports&Recreation&Games," "www Travel&Attractions," and "www Tourist Offices." I now have 53 such files organized into a hierarchy of folders related to topics that interest me.

Each spreadsheet has many URLs that I can select, copy, and paste into a browser window. I organize my URLs into convenient subtopics within each spreadsheet and hot-link those that I use often.

RICHARD L. GOODBODY
San Diego, California

Crossed Cables

I COULD NOT BELIEVE WHAT POOR performance David Pogue got from his cable modem ("Differently Cabled," *The Desktop Critic*, April 1999). Twenty-four seconds to download Macworld.com? Golly, my cable modem is several times faster than his.

Pogue downplays the advantages of a cable modem. It is about the same price as an Internet service provider and less expensive than having a second phone line and an ISP. Pages that used to take minutes to download now take seconds. On poorly handled sites, there is only a little difference in download speed, but Macworld.com is not one of them. I'm used to downloads of at least 80 Kbps, and similar uploads. Pogue's conclusion that the only real advantage is not having to spend time connecting via phone line is a gross disservice to a wonderful new technology.

JAMES E. GRAMZE
Dearborn Heights, Michigan

Weirdly enough, my cable modem continued to slow down after I wrote the column. I called Microsoft tech support and learned about a conflict between RAM Doubler and Internet Explorer 4.5. Without RAM Doubler, Web pages appear on my screen in two or three seconds, which is much more representative of a cable modem's actual performance. I'm happier with that cable modem with every passing day.—David Pogue

Disproving an Adage

ANDY GORE STATED IN "BARGAIN Hunters, Beware" (*The Vision Thing*, April 1999) that "if a deal seems too good to be true . . . it is." That is not always the case. One day I was procrastinating and came across 800.com. It was selling three CDs, DVDs, or VHS tapes for $1. My first thought was the same as Gore's: this was too good to be true. After further examination I found there were no catches to the deal, and it even included shipping and handling. They even offered the more popular films and recordings. So I ordered three movies, and in about four weeks I

continues

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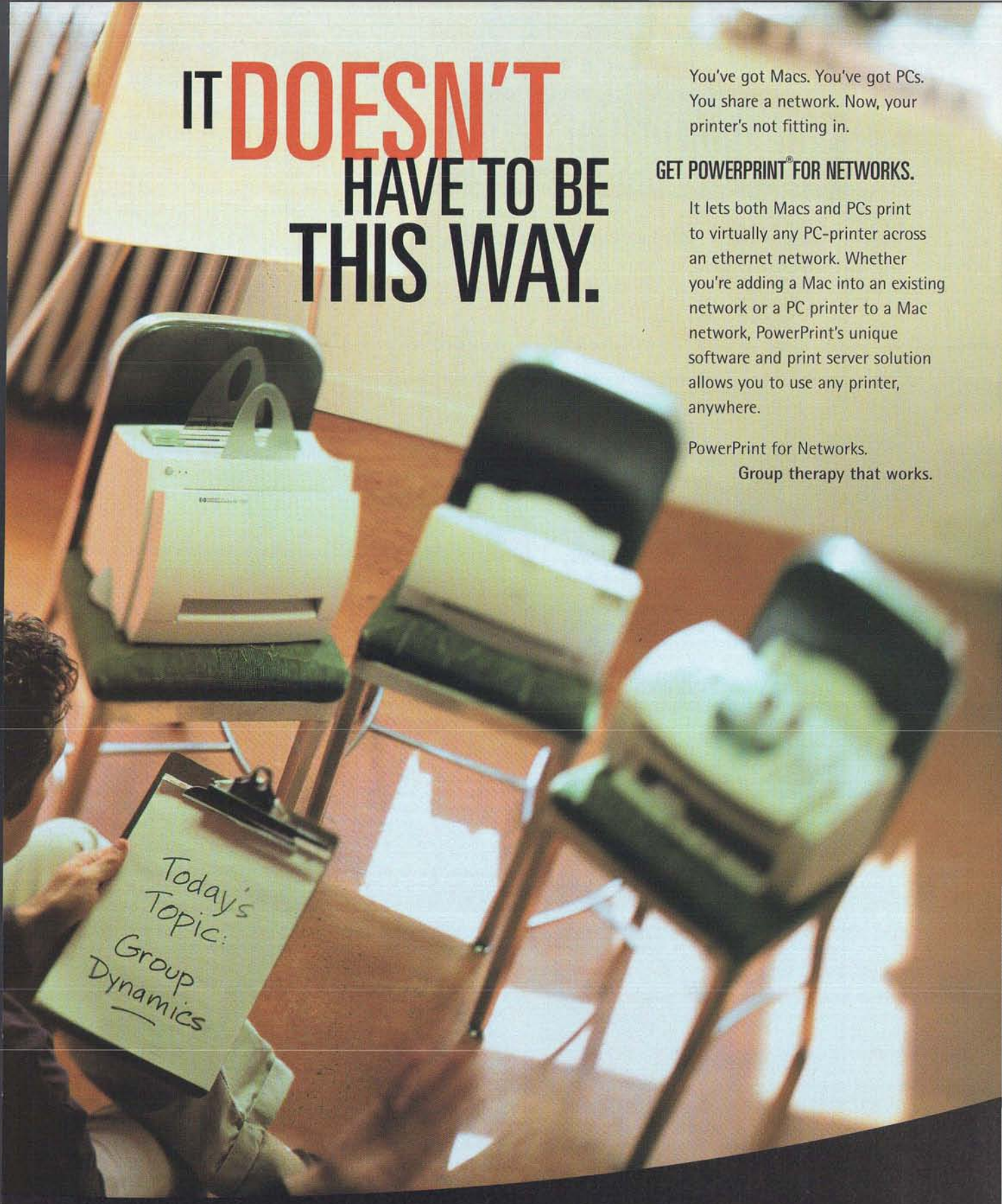

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MICHAEL FRANK
Waterbury, Vermont

Faster Than a Speeding Pentium

I'M A RECENT MACINTOSH CONvert and was a little skeptical about Apple's claims that the G3 processor is faster than a Pentium II and that Mac OS 8.5 is better than Windows 98. I'd like to apologize to all Mac users and to Apple for any misconceptions I may have had.

I bought a lime iMac after looking at them countless times in the stores and reading about them in *Macworld* and at the Apple Store. I was very impressed with the speed of the G3 processor. I decided to test it out against my Pentium II 350MHz computer, so I placed both computers side by side and turned them on. By the time the Pentium II computer finished booting up, my iMac was already surfing the Net. Kudos to Apple for designing a fantastic computer and OS, and thanks to *Macworld* for the informative articles. Without all that information I might never have bought an iMac—I shudder to think.

MICHAEL JACK HOOPER
Twentynine Palms, California

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CORRECTIONS

Contrary to our assertion, Alsoft's DiskWarrior can see some unmountable disks (Reviews, *April 1999*).

Silicon Graphics' version of Unix is Irix, not Irex ("Put Your Files in the Fast Lane," April 1999).

Only some of Extensis Intellihance Pro 4.0's functions don't show up in Adobe Photoshop's Actions palette (Reviews, *April 1999*). *In the review, we erroneously indicated that none of the functions appeared.* m

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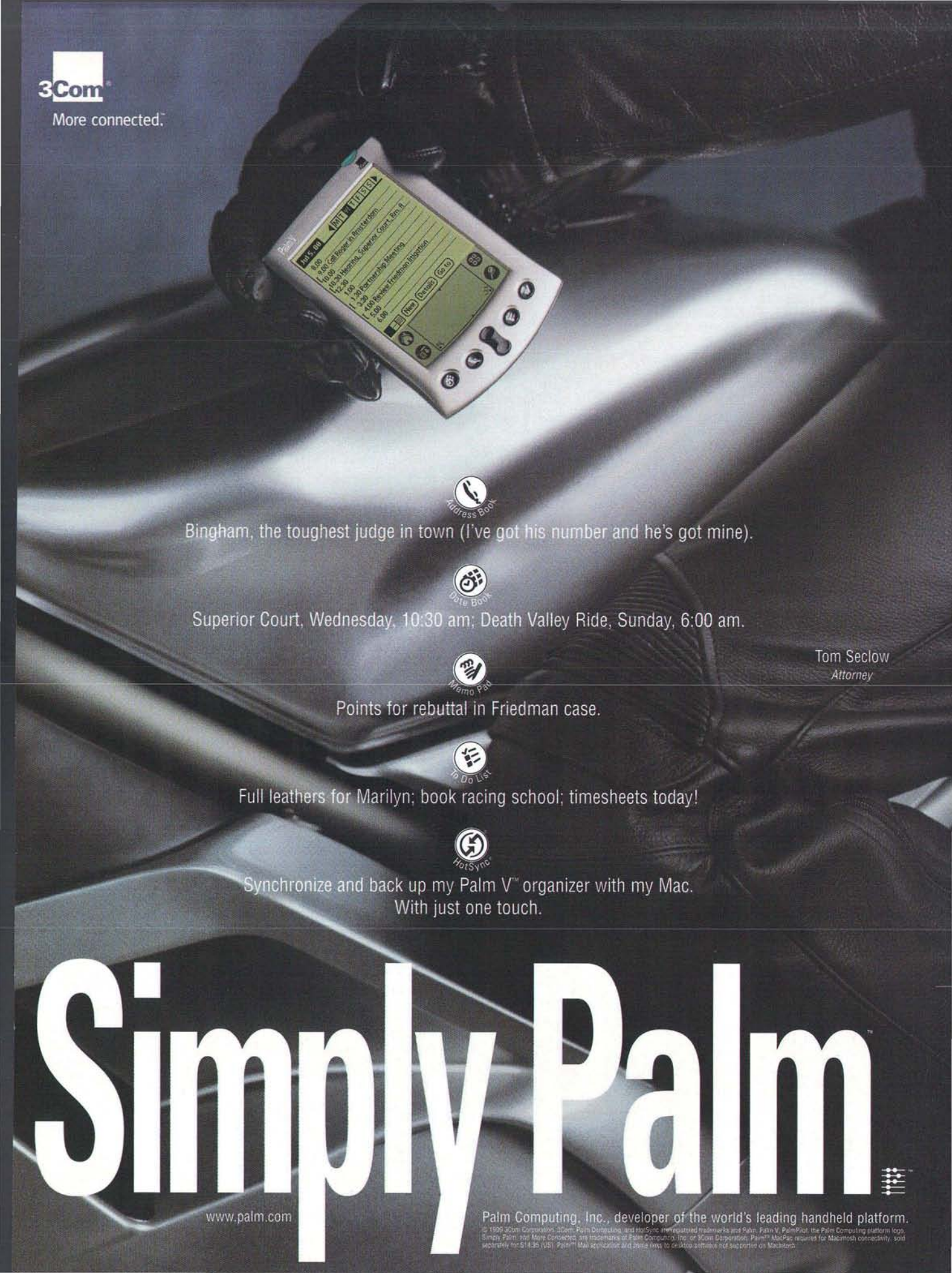
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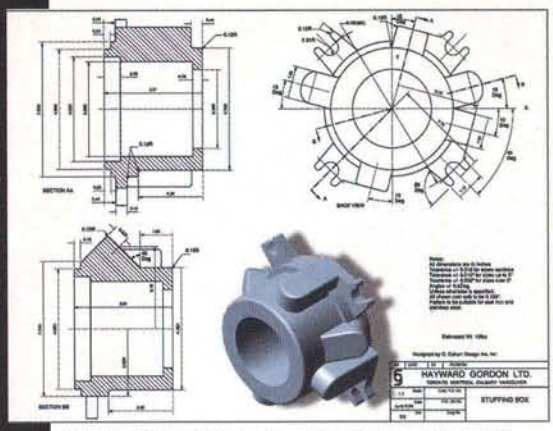

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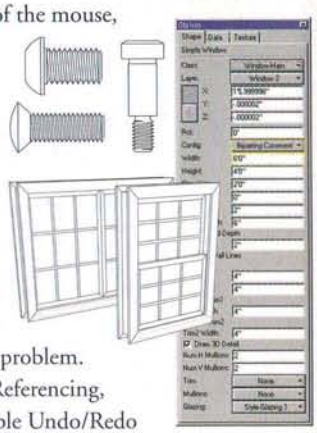

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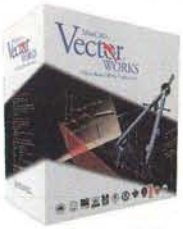

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The Vision Thing

by Andrew Gore

To the Victor Goes the Stream

APPLE MUST FIGHT STRONG CURRENTS TO WIN THE INTERNET-BROADCASTING RACE

FOR YEARS NOW, TV and computers have been swimming up different forks of the same stream, headed for the same destination from various directions. Television has struggled to become more interactive. The computer industry, on the other hand, has labored to engage, fascinate, and enthrall computer users.

Both are headed toward an enriched form of interactive media that offers people choice and control without giving up quality and timeliness. Until now, you couldn't have it all. But thanks to ever-burgeoning bandwidths brought to you by technologies like cable modems (thanks, television industry) and DSL (thanks, computer industry), it's becoming possible to shove massive amounts of video into households in real time.

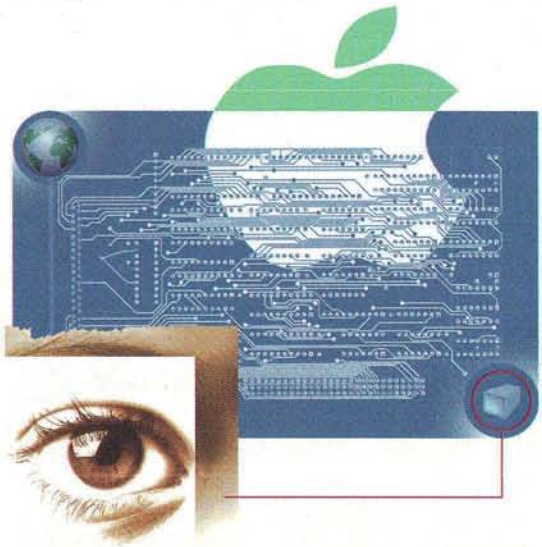
Up a Creek

Thanks to media-compression and -streaming technologies like Microsoft's Windows Media Technology and RealNetworks' RealMedia, the quality of Internet video keeps getting better. It's possible now to watch an entire channel's worth of programming live, with no waiting for files to download—albeit in a small window and with a few annoying skips and pauses. But even this low-fidelity experience has proven good enough to spark an explosion in Internet streaming. And the quality of audio-only streaming is so good that Internet radio could develop audiences larger than the wireless variety in short order.

Into this world Apple brings QuickTime 4.0, the edition of the venerable media standard that's able to stream media live over the Net. At first glance, the massive amount of QuickTime content already on the Net and that content's high quality would make it a fait accompli for QuickTime 4.0 to displace Windows Media and RealMedia and reign as the King of All Streaming Media. But Apple will find overtaking these two popular formats a challenge.

When it comes to video from the archives, QuickTime has the advantage. Roughly 50 percent of all video stored on the Internet is in QuickTime format. And QuickTime already serves as an intermediate step between the source material and other Internet streaming technologies. According to Apple, 90 percent of the content served up by RealVideo servers was previously in QuickTime format.

However, when it comes to broadcasting live video and audio, the advantage goes to RealNetworks and Microsoft. What counts here is the number of Web sites that have already based their Net broadcasting technology on those two companies' formats. Being so late to the market with robust streaming support, Apple has to swim hard and fast against a very strong current to catch up with RealNetworks and Microsoft. After all, setting up a streaming Web server is a difficult task, and the Web sites that have already invested significantly in one particular format are unlikely to get rid of it any time soon. From their standpoint, if the technology they're currently using isn't broken, why fix it?



JOHN RITTER

Spawning Grounds

Luckily for Apple, there are still opportunities here. Because the bandwidth to support even a moderately satisfactory streaming experience is still limited to businesses and the households lucky enough to have high-speed access, video streaming is still a relative rarity. The trick for Apple won't be to go after the pioneering sites that have already cast their lot with a particular standard.

What Apple can do is ride the big wave that follows the first brave adopters of new technologies. It must connect with the vast number of sites that would like to offer streaming but have steered clear of it because of cost, logistics, and a seeming lack of demand. To reach them, Apple must make serving live video inexpensive and easy. The Mac OS X Server–based QuickTime Streaming Server is a step in the right direction, but the company also needs to let other companies use Apple's software and hardware package to roll out and support those systems throughout the world. There are thousands of site owners out there who would jump at the chance to offer live video and audio streaming if it could be set up and made to work without a huge output of time or money.

It's true that Apple is late to offer streaming as a part of QuickTime, and that the two formats already on the market have made a lot of headway. But while the current is strong, this stream is also wide—and with a little aggressive marketing, QuickTime's superior technology could still win the race. **m**

Questions? Comments? E-mail them to Andy at visionthing@macworld.com.

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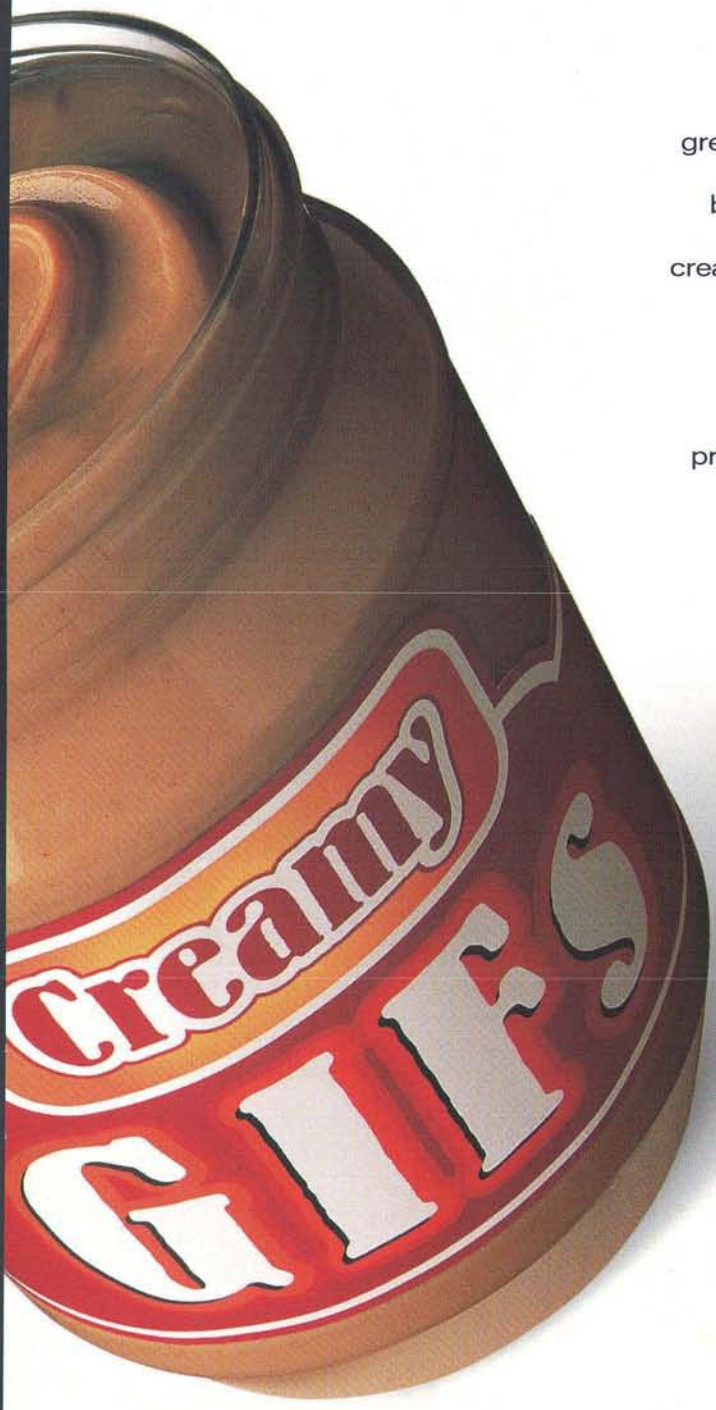

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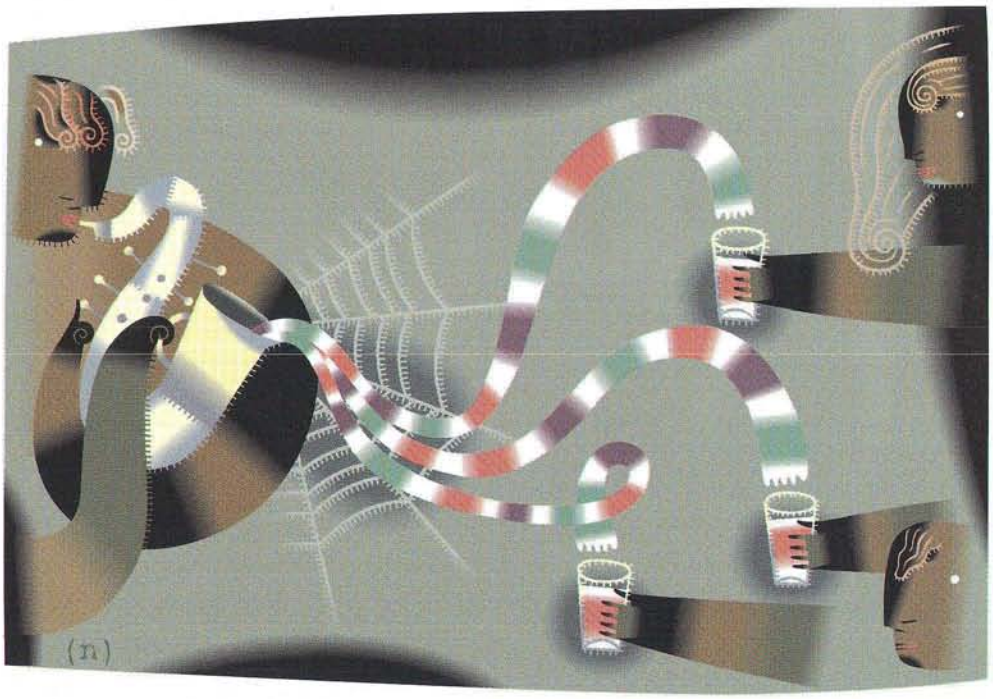
News

multimedia

QuickTime 4 Moves Upstream

APPLE'S MULTIMEDIA SOFTWARE GETS LIVE STREAMING CAPABILITIES

by Stephen Beale



JEFF NEUMANN

Apple's QuickTime logo, already a common sight on many Web pages, could become even more familiar to Internet users as the company rolls out a new version of its multimedia software with live streaming capabilities. Upgrade to QuickTime 4.0, and the same browser plug-in you use to view QuickTime movies on the Web will let you watch live broadcasts as well. It's all part of Apple's strategy to make QuickTime the reigning multimedia standard for the Internet.

Apple unveiled QuickTime 4.0 in April at the National Association of Broadcasters convention in Las Vegas. Along with the new version, Apple announced that it will give away the source code to the QuickTime-based server software needed to host live Internet broadcasts. A public beta version of QuickTime 4 is available for free download (www.apple.com/quicktime/). Apple won't say when the final version will be available.

Live Streaming

QuickTime 3 introduced the ability to stream QuickTime movies over the Internet, meaning you could begin watching a movie as it was being downloaded. However, unlike RealNetworks' RealMedia or Microsoft's Windows Media (formerly NetShow), QuickTime 3 did not support streaming of live audio or video broadcasts. QuickTime 4 supports live streaming through Apple's new QuickTime Streaming Server software, which Apple will make available as a free update to Mac OS X Server. Apple will also offer an open-source version of the software, the Darwin Streaming Server, that developers can download for inclusion in their applications (see "Apple Goes Open Source with Mac Server," *News*, June 1999).

By opening its streaming software, Apple hopes to make it as easy as possible for developers to include live broadcast capabilities in their server products. Silicon Graphics, IBM, and Cisco Systems are already working to incorporate QuickTime streaming functions into their servers. Because QuickTime streaming is based on standard Internet protocols, Apple says it should be relatively easy for developers to create cross-platform versions of the software. In contrast, the streaming servers from Microsoft and RealNetworks are based on proprietary streaming pro-

continues

tocols. Neither server is available in a Mac version.

Apple's streaming technology also benefits from the other capabilities in QuickTime. QuickTime product manager Steve Bannerman notes that streaming content can be incorporated with other media types, so you could have a CD-ROM title that pulls in a live video stream, or an interactive QuickTime movie with controls that let you jump from one video channel to another. A single QuickTime movie can even include streams originating on multiple servers.

Despite these advantages, there's no assurance that Apple's streaming technology will catch on. Microsoft and RealNetworks are well established in this market, and both offer specialized software for handling tasks related to live streaming, such as pay-per-view operations. With its open-source strategy, Apple hopes that other developers might step in with such products, but there's no guarantee that they will do so.

Other Goodies

Aside from the real-time streaming capabilities, QuickTime 4 adds new playback software, a more flexible

continues on page 30

Epson's Stylus Color 740i

printing

Epson Unveils Photo Printers

NEW INK-JET MODELS OFFER FASTER OUTPUT AND SHARPER IMAGES

by Michael Gowan

Epson (800/463-7766, www.epson.com) has released the latest additions to its Macintosh-compatible ink-jet printer line, including two new photo printers and a flavorful version of its Stylus Color 740.

The $299 Stylus Photo 750, successor to the Stylus Photo 700, uses a six-color process to print photo-realistic images at up to 1,400-by-720-dpi resolution. It produces sharper images than its predecessor by using 6-picoliter ink droplets, compared with 11 picoliters for the Stylus Photo 700. It's also faster: at 720-dpi resolution, Epson claims, the Stylus Photo 750 can print an 8-by-10-inch photo in about two minutes, compared with five minutes for the previous model. The printer will be available only through mail order and online outlets. Epson will continue to sell the Stylus Photo 700 through retail stores for $249.

If you're going for the big picture, the new $499 Stylus Photo 1200 offers the same resolution, droplet size, and print speed as the 750, but with a maximum print area of about 12 by 44 inches. It replaces Epson's Stylus Photo EX.

Epson also announced an "iMac" version of its Stylus Color 740 ink-jet printer (see *Reviews*, January 1999). The $279 Stylus Color 740i features an iMac-inspired translucent design with a blueberry cover. If you don't like that flavor, you can order a lime, strawberry, tangerine, or grape cover for $14.95.

All three printers feature USB and serial connections.

multimedia

Final Cut Is Finally Here

APPLE RELEASES VIDEO SOFTWARE ACQUIRED FROM MACROMEDIA

by Stephen Beale

Apple Computer's decision last year to acquire Macromedia's Final Cut software raised a few eyebrows. The company that had so successfully narrowed its focus to Power Mac hardware and the Mac OS now appeared to be diverting its energies into the applications realm. The acquisition also seemed to place Apple on a collision course with Adobe Systems, whose Adobe Premiere dominates among under-$1,000 digital-video packages. But now that Apple has released Final Cut, its intentions are clearer: the company sees huge potential in digital video, and it wants to ensure that the Mac plays a central role in what is likely to be a booming market.

Middle Ground Apple says that the $999 package occupies a middle ground between Premiere and high-end digital-video systems from Avid Technology and Media 100. In addition to offering basic video-editing functions, Final Cut provides many of the compositing and special-effects features found in Adobe After Effects. It also

A New Look for QuickTime Player

APPLE, WHICH HAS PINNED MUCH OF ITS FORtunes on cutting-edge hardware design, is applying similar principles to its software. The QuickTime Player (formerly MoviePlayer) sports a revamped interface, new audio and video controls, and a Favorites drawer for storing saved movies and links to QuickTime content on the Web.

As before, Apple is offering the QuickTime Player in two versions. The free Basic version is limited to playing back QuickTime movies. The $30 Pro version provides modest editing functions, enhanced playback features such as looping, and the ability to save QuickTime movies to disk. If you already have QuickTime 3 Pro, you are automatically upgraded to the new Pro version when you install QuickTime 4.0.—MACWORLD STAFF

KEVIN CANDLAND

offers some productivity features commonly found in high-end video-editing programs, such as the simultaneous trimming of multiple tracks and sophisticated audio-syncing functions.

Final Cut also provides tight integration with the high-speed FireWire interface built into the Power Mac G3, as well as many—but not all—FireWire-equipped digital camcorders based on the popular DV standard. You can control DV cameras directly from Final Cut, copying audio and video to your hard disk for editing.

Explosive Growth? Apple sees DV as one of several factors contributing to explosive growth in digital video. Tim Myers, Apple's senior product manager for video products, notes that video professionals and consumers alike now have access to relatively inexpensive digital-video–capture devices. In addition, opportunities for distributing digital video are expanding, thanks to the Internet and DVD. What's missing, he says, are affordable, easy-to-use tools that are well integrated with supporting hardware, a niche that Apple hopes to fill with Final Cut and special configurations of the Power Mac G3.

Adobe Systems, for its part, is touting Premiere's tight integration with other Adobe packages. The company has announced a forthcoming Premiere plug-in that will allow the program to take advantage of new functions in QuickTime 4, including direct control of DV cameras and the ability to produce "hinted" movies to reduce file size. Final Cut also competes with EditDV, a digital-video–editing program from Digital Origin (formerly Radius).

multimedia

Web 3-D Heats Up for Mac Users

METACREATIONS READIES METASTREAM FOR MAC

by Stephen Beale

For Macintosh users, the ability to view and navigate 3-D graphics on the Web has been more promise than reality. The Virtual Reality Modeling Language (VRML), the reigning 3-D Web standard, has failed to catch on among Macintosh *or* PC users. However, two companies, MetaCreations (805/566-6200, www.metacreations.com) and the Sweden-based Cycore (www.cycore.com), are attempting to remedy the situation by introducing their own Web-based 3-D graphics technologies. In the meantime, an industry group called the Web3D Consortium, with support from Apple, Microsoft, and other heavyweights, is working on an official successor to VRML.

Metamorphosis MetaCreations introduced its MetaStream technology a year ago, but the initial version, developed with cooperation from Intel, was available only for the PC. The company is now preparing a Mac version of the MetaStream player, and current Mac releases of Bryce and other MetaCreations software packages can export scenes as MetaStream content. Although you need a browser plug-in to view the content, MetaCreations scored a coup last year when Microsoft agreed to distribute MetaStream with Windows.

Formerly known as "The Visual Computing Software Company," MetaCreations now refers to itself as "The Creative Web Company." One victim of the transition is apparently chief design officer Kai Krause, who left the company in April for undisclosed reasons.

With its new focus, MetaCreations plans to offer tools that make it easier to create 3-D graphics for the Web. One of the most intriguing new programs is Canoma, a $499 package that creates 3-D environments from a series of still photographs. For example, you can use aerial photos of a city to create models of buildings that you can navigate with the MetaStream player.

At the Core Cycore's 3-D technology, Cult3D, is aimed at electronic-commerce applications. It has two components: a Windows-based 3-D authoring package and a free cross-platform Cult3D Animation player. You don't have to pay for the design software, but you do have to pay a $3,600 licensing fee for each 3-D model you post.

Web3D As MetaCreations and Cycore push their plug-in technologies, the Web3D Consortium (www.web3d.org), successor to the industry group that established VRML, is working on a new accredited standard for 3-D graphics on the Web. The standard, known as X3D, is based on the Extensible Markup Language (XML).

BRYAN WIGGINS

Product WATCH

Play Fetch with FileMaker **FileMaker Pro** is playing with the big boys of information management now that FileMaker (800/325-2747, www.filemaker.com) has announced enhanced support for the ODBC database standard. **FileMaker 4.1** gave you the ability to read ODBC databases. Now, with the company's new **ODBC Driver**, you can use FileMaker as an ODBC data source, permitting ODBC client programs, including Microsoft Word and Excel, to interact with FileMaker databases. You can download a free preview of the driver from the FileMaker Web site.

Stay Updated Keep your software current without the hassle of surfing to dozens of Web sites. Insider Software's (800/700-6340, www.insidersoftware.com) **UpdateAgent 3.0** scans your Mac for installed software and then searches the Web for any free updates. The new version provides an improved interface and greater control over file downloads. You can download updates through Insider's Web site for $50 per year, or purchase a CD version for $90 per quarter or $250 per year. A onetime update of your Mac's software costs $12.95.

New Dimension to 3-D Now you can spruce up your 3-D models without rendering them. Maxon Computer's (877/226-4628, www.maxon.net) **3D Painter**, like MetaCreations' **Painter3D**, lets you paint directly on the surface of 3-D objects using

continues

a brush or pencil tool. Painting effects include glows, transparency, and surface relief. The program is expected to ship this fall; price had not been set at press time.

Scans for Everyone Canon Computer Systems (800/652-2666, www.ccsi.canon.com) has unveiled two new flatbed color scanners. The $499 **CanoScan FB 1200S,** scheduled to ship in June, offers 1,200-dpi resolution and connects via a SCSI port. For simpler needs, the $129 **CanoScan FB620U** features 600-dpi resolution and a USB connection. It should be available by the time you read this.

Printer Equality No need to be jealous of PC users' abundance of printer choices. Infowave Software's (800/663-6222, www.infowave.com) $249 **PowerPrint for Networks** lets Macintoshes print to any of 1,600 PC printers over an Ethernet connection. The bundle includes printer drivers, a 10/100BaseT multiprotocol print server, and a printer cable.

Serial Savior Don't throw away those serial-port peripherals just yet. The $39.95 **Stealth Serial Port** from GeeThree.com (www.geethree.com) converts the blue Power Mac G3's internal modem slot into a standard mini-DIN8 serial port for printers, digital cameras, and other serial devices. Installing the port precludes use of the modem.—EDITED BY MICHAEL GOWAN

"QUICKTIME 4 MOVES UPSTREAM"

continued from page 28

installer, a handful of new file formats, and improved versions of the Sorenson and Qdesign codecs that were introduced in QuickTime 3. As with the real-time streaming functions, many of these features were designed to make QuickTime more appropriate as a universal media format for the Web.

QuickTime Player The QuickTime MoviePlayer is now known as QuickTime Player and features a revamped design resembling the interfaces in Kai's Super-Goo and other MetaCreations programs (see "A New Look for QuickTime Player"). The QuickTime PictureViewer, used to view and convert still images, sports a similar new look. As before, Apple will offer the QuickTime Player in Basic and Pro versions.

Flexible Installer Downloading previous QuickTime versions was an all-or-nothing proposition: if you wanted any part of the software, you had to download the whole thing, a hefty 7MB to 8MB. QuickTime 4.0 includes a flexible new installer that lets you add only the components you really want, making the software more attractive to users who might balk at the prospect of a huge download.

You can choose from a 2.2MB Basic Playback download for viewing QuickTime movies and streaming Web content; a 2.7MB Enhanced Playback download that adds support for QuickTime VR, Video for Windows (AVI), MPEG files, video effects, and interactive movies; and a 5.6MB QuickTime Authoring download that adds components for creating QuickTime movies. A Custom Download option lets you pick specific QuickTime components. QuickTime 4 also provides for easier software updates; a menu option in QuickTime Player automatically accesses Apple's Web site to download new components.

New File Formats One of QuickTime's big advantages is the long list of image, audio, and video formats it supports. Developers of QuickTime-based software can easily add the ability to import or export the supported formats. It's also a boon for Web developers, because the QuickTime browser plug-in lets you view a host of media types that might otherwise require separate proprietary plug-ins.

New readable formats in QuickTime 4 include FlashPix, a bitmap image format developed by Live Picture, Microsoft, Hewlett-Packard, and Eastman Kodak; Flash, the vector animation format developed by Macromedia; and MP3, a popular standard for downloading music from the Web. With Flash support, you will be able to use Flash animations as interactive elements in QuickTime movies. For example, you could include animated menu items that take the viewer to different parts of a movie.

QuickTime 4 also includes new versions of the Sorenson codec, used to compress QuickTime video, and the Qdesign audio codec. Apple says the upgrades offer higher quality, faster encoding, and new features designed to accommodate QuickTime's streaming capabilities. Sorenson Vision (435/792-1100, www.s-vision.com), the developer of the Sorenson codec, has announced a $199 Mac OS program, Sorenson Broadcaster, that configures video or audio for streaming through the QuickTime server software.

Along with announcing QuickTime 4, Apple released Final Cut, the digital-video–editing software the company acquired last year from Macromedia (see "Final Cut Is Finally Here," elsewhere in this section).

ARNOLD TIOSEJO

Fly on the Wall

HERE'S A MULTIMEDIA PROJECTOR THAT DEFINITELY fits in the overhead compartment. The $6,999 Dragonfly LP330, from InFocus (800/294-6400, www.infocus.com), weighs just under five pounds and measures 9.0 by 10.5 by 2.5 inches. Scheduled to ship in June, the lightweight projector produces 650 ANSI lumens at 1,024-by-768-pixel resolution.—MICHAEL GOWAN

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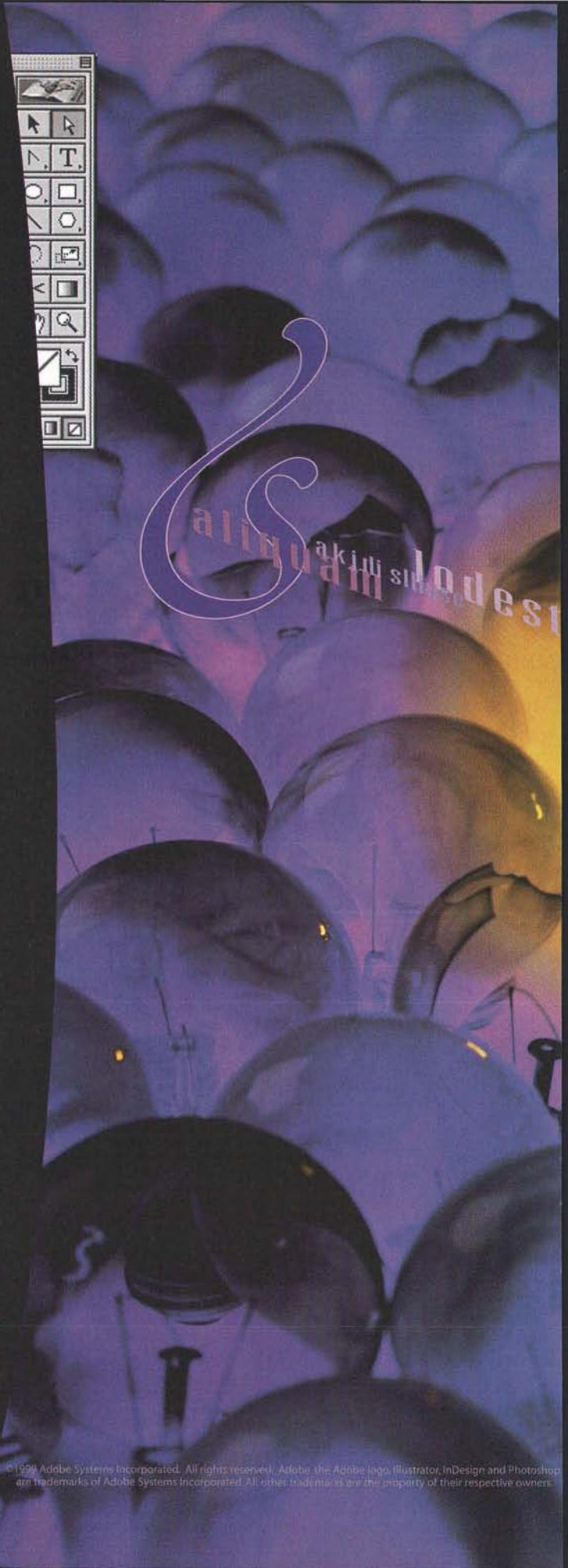

INSPIRING.

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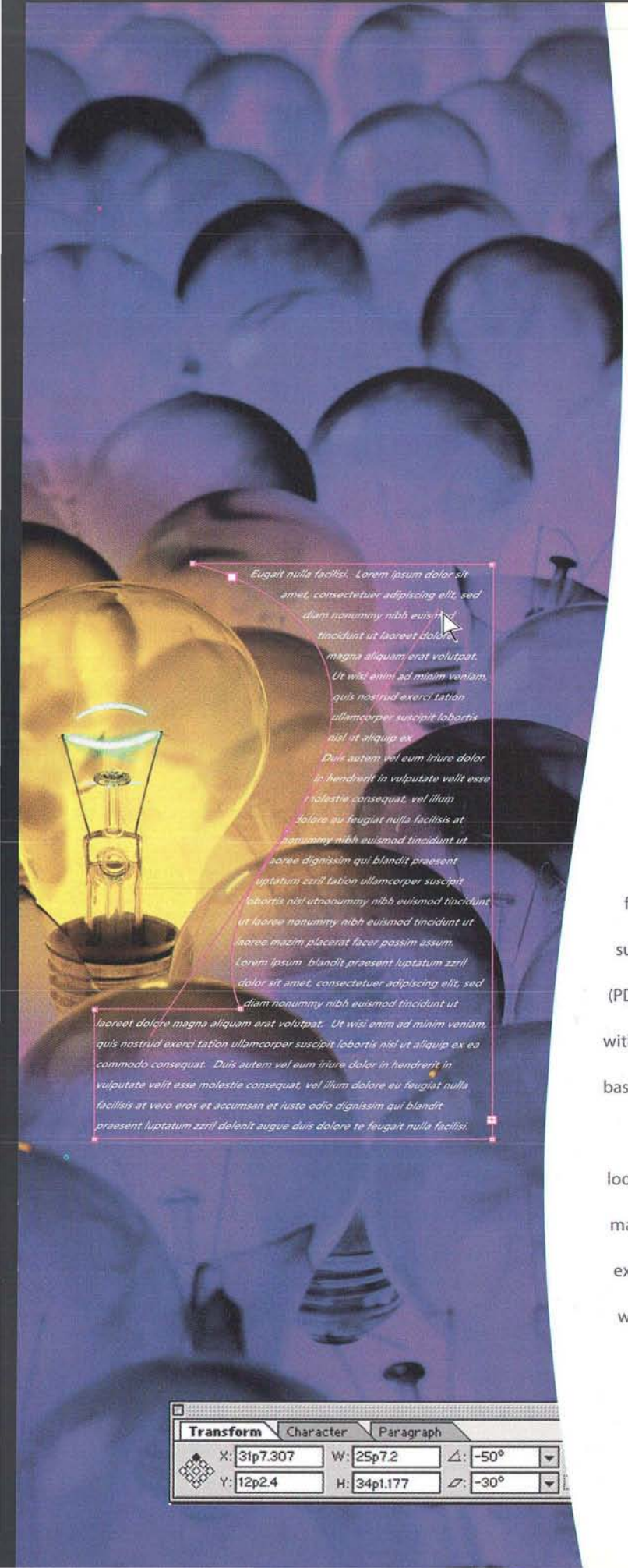

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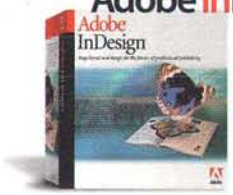

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Reviews

Mac OS X Server

SERVER SIGNALS A NEW ERA IN MAC NETWORKING

ROBERT PASTRANA

A COMMON CONVERSATION starter among Macintosh server administrators is "The Mac would be a great server if only..." If only it had preemptive multitasking. If only it supported multiple network interfaces. If only it supported remote clients. Mac OS X Server is Apple's answer to the "if onlys." A completely different operating system from Mac OS 8.5, OS X Server not only addresses all of its predecessor's shortcomings but also retains the flavor and familiarity of the graphical user interface we know and love.

Like the end-user version of OS X, due next year, OS X Server features a completely new (to the Mac) operating-system kernel that's based on Mach 2.5 and BSD 4.4 Unix and offers preemptive multitasking, protected memory, process management, and standards-based scripting. The server edition, which is geared toward file, client, and Internet serving, includes Apple file sharing, an Apache Web server, WebObjects application-development tools, and a new feature called NetBoot for managing networks of client workstations. This last feature is clearly the most enticing aspect of OS X Server in that it should vastly simplify network administration while lowering deployment costs.

Installing OS X Server couldn't be simpler: insert CD, boot computer, click on Install. A setup assistant asks you a few salient questions about your network and which OS X Server features you plan to use and then automatically configures the server for you. Once it's installed, though, you'll find that many advanced features use a command-line interface rather than the familiar Mac interface, making OS X Server a challenge to use. (If you spring for the $4,995 bundle—OS X Server preinstalled on a Power Mac G3—you don't need to worry about installation and you get a handy System Image CD for restoring your system.)

The New Stuff

Considering OS X Server's radically different innards, you're probably wondering about the look-and-feel of its application-level services. It's a mixed bag: from the client's point of view, using OS X Server file sharing is largely indistinguishable from using AppleShare IP, while OS X Apache offers a completely different experience from AppleShare's Web server. NetBoot is an entirely new animal, with no parallels in the current Mac universe.

Users access OS X Server's Apple file services exactly as they have all previ-

REAL PRODUCTS REAL RATINGS — Reviews you can trust: Macworld rates only final shipping products, not prototypes. What we review is what you can actually buy.
OUTSTANDING: ♦♦♦♦♦ VERY GOOD: ♦♦♦♦ GOOD: ♦♦♦ FLAWED: ♦♦ UNACCEPTABLE: ♦

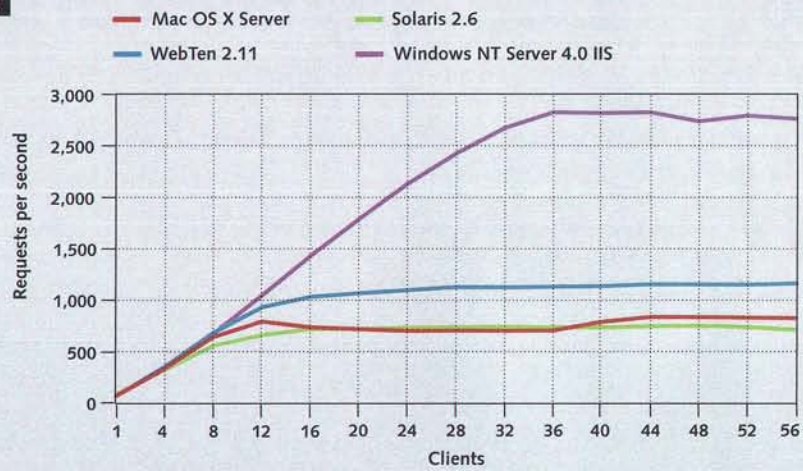
ous Mac OS file services—by mounting remote disk volumes and using them as if they were local. OS X Server uses a Web-based manager that AppleShare administrators will welcome: just point a Web browser to the Remote Administration URL and you can add users, change permissions, and control server performance from any authorized workstation (even from Windows-based systems). OS X Server is not AppleShare IP, however; it lacks printing, e-mail, DNS, Windows file-sharing, and firewall functions.

The Apache Web server bundled with OS X Server is a full port of the standard Apache distribution. This means you can run off-the-shelf Apache enhancements, download new Apache Group updates, run Secure Sockets Layer (SSL) encryption, and support multiple Web sites, although none of these additional features are easy to exploit. Apache isn't Mac software, and Mac zealots will find a lot to complain about with Apache's administration, especially compared with that of other Mac-savvy Web servers. Although Apple includes a setup assistant to help you perform basic Apache configuration chores, serious users must resort to old-fashioned text-file editing to configure advanced features such as SSL encryption. Fortunately, Tenon Intersystems is working on a graphical interface and SSL overlay for OS X Apache that will address these shortcomings.

NetBoot lets you remotely boot Macintosh G3 computers from an OS X server, using the server as the sole source of such resources as application programs, printer access, and disk storage. (This feature requires a firmware upgrade on older G3 Macs.) A special Macintosh Manager deputizes a specific client machine as an administrator, from which you then establish basic NetBoot parameters and the network topology. When you boot a client Mac from an OS X server, the client prompts you for a user ID and password and then establishes remote access to resources—preferences, desktop organization, OS configuration, and server volumes—for that user. Thus, you can log onto any client Mac via Macintosh Manager and access your personal computing environment. NetBoot makes central-site administration easy, reduces the cost of client computers, and improves overall network security by giving administrators a single point of control.

Macworld LAB TEST

As a Web Server, OS X Lags



Behind Our Tests

We tested Web-server performance using ZD Benchmark Operation's WebBench 3.0 (www.webbench.com). The servers consisted of an Apple Power Macintosh G3/400 running Mac OS X Server and Tenon Intersystems' WebTen 2.11; a 500MHz, multiprocessor Compaq 1850R running Windows NT Server 4.0 Internet Information Server (IIS); and a Sun E250 running Solaris 2.6. The 56 clients—a mixture of 233MHz Pentium IIs, 200MHz Pentium Pros, and 166MHz Pentiums running Windows 95—were connected to two Extreme network switches divided into four segments.—**Macworld Lab testing supervised by Kevin Mitchell**

How Well It Works

Macworld Lab compared OS X Server's file-serving performance with that of AppleShare IP 6.1 and Microsoft Windows NT Server 4.0. We found that OS X Server makes a mediocre file server, capable of handling more users than AppleShare IP but generally taking twice as long to move files. Still, OS X Server was almost twice as fast as Windows NT Server (when running AppleShare on Windows NT; OS X doesn't support Windows file sharing). You won't want to run OS X Server if you need stellar file-serving performance, but if you're using it as a NetBoot server, you'll find the concurrent file serving a great convenience.

We tested OS X Server's Web-server performance against that of Tenon's WebTen 2.11, Windows NT Server 4.0 Internet Information Server (IIS), and Sun Solaris 2.6. OS X Server's Apache is a decidedly slower Web server than WebTen running under Mac OS (see "As a Web Server, OS X Lags"). With ten or fewer users, the two performed comparably, but under heavier loads, WebTen served up to 40 percent more requests per second. OS X Server's performance was similar to that of Solaris running Apache, but the large-scale, multiprocessor NT Server IIS far outstripped OS X (a smaller NT Server configuration comparable to the Mac tested wasn't available at press time).

Macworld's Buying Advice

With performance numbers well below those of traditional Mac OS servers, Mac OS X Server really isn't a contender in transaction-intensive environments; stick with AppleShare IP and WebTen for file and Web serving, respectively. But as the herald of a new paradigm in Mac networking, OS X Server's NetBoot feature promises to simplify network administration vastly while giving users new freedom from their physical desktops.—MEL BECKMAN

RATING: ♦♦♦½ **PROS:** Preemptive multitasking; protected memory; NetBoot client/server paradigm; multiple network interfaces. **CONS:** Mediocre performance for file and Web serving; incomplete graphical interface; incomplete documentation. **COMPANY:** Apple Computer (800/795-1000, www.apple.com). **LIST PRICE:** $499.

400MHz G3 Upgrade Cards

FAST G3 CARDS ARE WORTH A SECOND LOOK

WHEN WE LAST EVALUATED G3 upgrade cards (see "Born-Again Macs," February 1999), 400MHz G3 accelerators for pre-G3 Power Macs were just coming to market and were so prohibitively expensive that we could not recommend one. Prices have since come down, and with a couple of new manufacturers joining such familiar faces as Newer Technology and Sonnet Technologies, time was ripe for a second look.

We tested seven 400MHz G3 accelerators that plug into the processor slot of the Power Mac 7500, 9500, and 9600: Mactell's PowerJolt 400/200, met@box's JoeCard 400/200, Newer Technology's Maxpowr G3 400/200, Phase 5's Maccelerate 750, PowerLogix's PowerForce G3 400/200, Sonnet Technologies' Crescendo G3 400/200, and the XLR8 Mach G3 400/200. Most of the cards also work with some Macintosh clones from Power Computing and Umax Technologies.

All of the cards boosted the performance of our test platform, a Power Mac 9500, approaching the speed of our 400MHz reference system. However, although prices have fallen dramatically, these cards still aren't inexpensive, and you may find that it's best to save your money for a true G3 Power Mac.

Most of the cards installed easily, although you may have trouble if you want to accelerate a Mac clone housed in a low-profile box. The Newer Technology and XLR8 cards have removable brackets so they can fit in the smaller enclosures, but the other cards are too large. Mactell's PowerJolt was a tight fit in our test system, and it requires a separate power connector for a cooling fan that's mounted to its heat sink.

Most of the cards feature switches to change the CPU speed or other settings. The PowerForce G3, PowerJolt, Maccelerate 750, and JoeCard all feature rotary switches, but in the latter two, the controls are inaccessible when the cards are installed. The Mach G3 has 12 DIP switches that you can set from the top. The Maxpowr G3 has four DIP switches to set which Mac model you're using. The Crescendo G3 was the only card that dispenses with switches altogether, largely because it doesn't let you change CPU or cache settings.

Performance

To gauge performance, we ran CPU benchmark tests using the MacBench 5.0 Processor test (see "Speed, but at a Price") and also timed typical operations in Adobe Photoshop 5.02. There was some discrepancy between the two sets of tests. MacBench showed a small but noticeable gap in CPU scores between the slowest and fastest cards, and a couple of cards nearly matched our reference system, a 400MHz Power Mac G3. The Photoshop tests (not shown) yielded a narrower speed difference among the cards, but here the blue Power Mac clearly outpaced all of the cards.

Why the difference? The system bus in the blue Power Mac G3 is much faster than those in older Power Macs, so the new G3 systems should be faster than older Macs equipped with G3 upgrades. The MacBench Processor score emphasizes CPU and cache-bus speed over system-bus speed, while Photoshop relies more on overall performance.

Nevertheless, both sets of tests showed relatively little difference between the fastest and slowest cards. The top performer was the Maxpowr G3, followed by the JoeCard. The slowest card was the Mach 3, which nevertheless boosted our Power Mac 9500's performance well past that of a 300MHz Power Mac G3. Newer Technology introduced the Maxpowr at $1,599, making it prohibitively expensive, but after two rounds of price cuts, you can now purchase the card for a much more reasonable $749.

Most of the cards let you boost performance even further by stepping up the CPU speed (a process called overclocking) or increasing the speed of the cache bus. For example, when we boosted the Maccelerate 750 to 440MHz, the card outpaced our reference system in the MacBench CPU test. But again, the reference system was faster in our Photoshop tests.

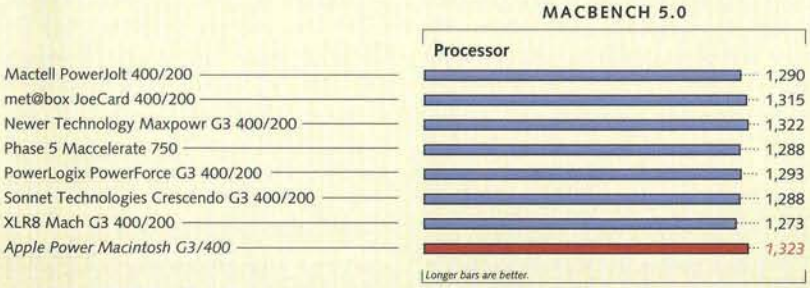
Although you can get a performance boost from overclocking, we don't recommend it because it can lead to frequent system crashes. You can test your system's ability to handle the higher speeds by running Apple's Graphing Calculator—or any other appropriate software—in demo mode overnight. If your system is still running in the morning, it's likely that you can get away with overclocking.

Aside from the Sonnet and Newer Technology cards, all of the accelerators give you the option of stepping up the CPU speed by setting DIP or rotary switches. However, to access overclock

Macworld LAB TEST

Speed, but at a Price

Best result in red. *Reference system in italics.* **MacBench 5.0 scores are relative to that of a Power Mac G3/300, which is assigned a score of 1,000.**



Behind Our Tests We tested all cards on a Power Macintosh 9500/132 with 64MB of RAM, a 16GB RAID storage system with an Adaptec 2940UW Ultra Wide SCSI card, an iXMicro ix3D Pro Rez graphics card, a 2MB disk cache, and Mac OS 8.5.1. Displays were set to 1,024-by-768-pixel resolution at 24-bit color.—**Macworld Lab testing supervised by Jeffy K. Milstead**

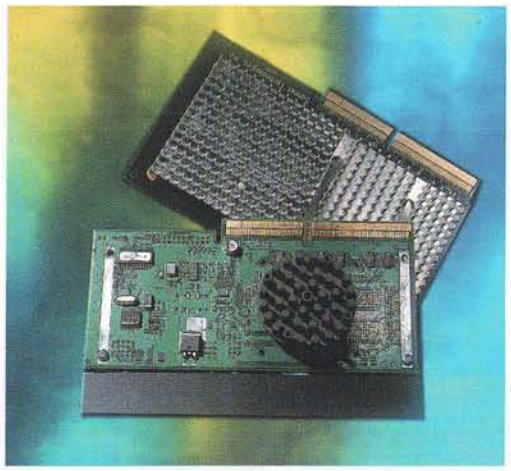
frequencies on the Maccelerate 750, you have to cut a trace on the circuit board, which voids the warranty.

By default, all of these cards run the cache bus at half the CPU speed, hence the "400/200" in most of the model names. However, some cards include software that lets you experiment with faster cache-bus speeds. You can get a slight performance increase, but again at the potential cost of frequent system crashes. The Newer Technology and XLR8 cards have automatic sensing features that prevent you from using cache speed settings that won't work.

Different Power Macintosh families have different system-bus speeds, and we found that some cards handle the variations better than others. The Maccelerate 750 operated reliably at a bus speed of 53.7MHz, but the XLR8 card, at its default bus setting of 50MHz, could not boot in a Power Macintosh 9500, which uses a 50MHz system bus. We had to reduce the card's bus setting to 49.1MHz to run our tests.

Compatibility

Compatibility has improved tremendously since *Macworld* last tested G3 upgrade cards. Previously, we found that some cards had trouble booting from disk arrays or running Retrospect backups due to architectural differences between Power Mac G3s and older Power Mac systems. Since then, most of the vendors have released software that fixes the problem. In this round of testing, all of the cards successfully booted from a disk array connected to an Adaptec 2940UW Ultra Wide SCSI board. We also ran a series of Retrospect backups to a SCSI DAT drive without any errors.



SUZANNE ROADY

Speed Demons PowerLogix's PowerForce G3 400/200 (front) and Sonnet Technologies' Crescendo G3 400/200 (back).

However, some compatibility issues remain. With any G3 upgrade, you may notice display artifacts due to conflicts with the Power Mac's built-in video. The only remedy is to install a PCI graphics card. In addition, Apple will not guarantee that Mac OS X and its successors will run on older Power Macs with or without G3 upgrades.

All of the cards ship with control panels and/or system extensions needed to enable the acceleration. You can use the control panels to set cache speed and other options. Mactell's control software features a cluttered interface that resembles a race car's dashboard but does display the current CPU and cache speeds so you can tell if the card is working.

Macworld's Buying Advice

Prices for 400MHz G3 upgrades have fallen dramatically, but they're still on the high side, ranging from $699 to $959. Because the performance differences are minimal, price and ease of use should be the key buying factors. Fortunately, the top performer in our tests, Newer Technology's Maxpowr G3, is heavily discounted from its original $1,599 price tag. We also liked Sonnet Technologies' Crescendo G3, which features a three-year warranty.

The lower prices make these cards worth a close look, and it's likely that prices will fall even further. You still may be better off saving your money for a Power Mac G3, but if you have a heavy investment in your existing hardware or you don't want to give up a six-slot machine, then consider one of these accelerators.—JEFFY K. MILSTEAD

Speedy G3 Upgrades

Company	Product	Mouse Rating	List Price	Contact	Pros	Cons
Mactell	PowerJolt 400/200	♦♦♦	$699	888/622-8355 www.mactell.com	Is inexpensive; decent performance.	Poor documentation; installation requires separate power connector.
met@box	JoeCard 400/200	♦♦♦	$945	949/862-1180 www.joecard.com	Has good performance; three-year warranty.	Is a little expensive.
Newer Technology	Maxpowr G3 400/200	♦♦♦♦	$749	316/943-0222 www.newertech.com	Is fastest performer; good software.	Has no overclocking option.
Phase 5	Maccelerate 750	♦♦♦	$849	610/586-5703 www.phase5.de	Works at faster bus speeds; decent price.	Overclocking voids warranty.
PowerLogix	PowerForce G3 400/200	♦♦♦½	$959	888/769-9020 www.powerlogix.com	Has flexible speed settings; decent performance; three-year warranty.	Is a little expensive.
Sonnet Technologies	Crescendo G3 400/200	♦♦♦½	$699	800/786-6260 www.sonnettech.com	Is easy to install; three-year warranty.	Has no overclocking option.
XLR8 by Interex	Mach G3 400/200	♦♦♦½	$879	888/957-8867 www.xlr8.com	Good software and manual; fits in low-profile clones; high-quality wrist strap.	Didn't work at default system-bus speed.

Fireworks 2.0

SOLID WEB GRAPHICS TOOL GETS EVEN BETTER

BEFORE MACROMEDIA FIREworks, Adobe ImageReady, and Adobe ImageStyler came along, Web graphics designers had to jump through hoops—usually involving Adobe Photoshop and an array of Photoshop plug-ins and shareware utilities—to prepare images for the Web. With the release of Fireworks 2.0.2, Web graphics tools have come of age. This update fills in some of the original program's gaps and adds an assortment of features nearly every Web designer will find useful. Though the program is still lacking in a few areas, it covers the basics so well that it's hard to remember how we got along without such a tool.

Second Time's the Charm

Like its predecessor, Fireworks 2.0 lets you export images as GIFs, JPEGs, or PNGs, the most common image-file formats on the Web. Besides transforming existing images into Web-ready formats, Fireworks offers vector-based drawing tools and pixel-based image-editing tools that let you create and modify images and export them to Web-friendly file formats.

One of Fireworks 1.0's cleverest features was its ability to apply an effect—such as a glow, bevel, or drop shadow—to any object, even editable text blocks. The problem was that you could assign only one such effect to an object. With Fireworks 2.0, you can apply all those effects to an object, and once you've created a set of characteristics you can save it as a preset style in the Style palette. Another improvement is that the program now displays a text item on the canvas as you type and style it in the Text window, so you can see how it will look in your document.

Perhaps because it's a cross between an illustration tool and an image-editing tool, Fireworks still has some interface quirks. Since the program can interpret brushes and selections as either object-based (as in Macromedia FreeHand) or pixel-based (as in Photoshop), it's easy to get confused about which mode you're in at any given time. Fireworks 2.0 offers a couple of solutions to the problem: clicking on a bitmapped-image object with the marquee, lasso, or eraser tool automatically places you in image-editing mode, and in this version you can toggle easily between the two modes. However, if you want to touch up a bitmapped-image object with the paintbrush tool, you have to double-click on the object and then select the brush tool and begin to paint. Otherwise you'll be painting in vector mode, à la FreeHand, with your strokes floating on top of the bitmapped image.

Starting Fires Fireworks 2.0 lets you add multiple effects, such as glows, bevels, and drop shadows, to a single object.

An Expert Exporter

One of Fireworks 1.0's banner features was its Export window, which let you adjust GIF and JPEG settings to get the best balance of file size and image quality. Fireworks 2.0 also allows you to view four sets of image settings at once and compare the results, but this version adds the clever Export To File Size wizard. You select a target file size for your exported image, and Fireworks chooses image settings that reduce your image to the desired size. It's a great time-saver. The new version also offers much greater control over a file's color palette, a feature competitor ImageReady has always offered.

Fireworks 1.0 let you create multiframe images for rollover buttons, but version 2.0 improves the interface for doing so. The program now sports a Behaviors palette straight out of Macromedia's Dreamweaver, and it lets you create some pretty complicated actions—areas that change when you place your mouse over a different part of the image, for example. But if you're just creating simple button rollovers, Fireworks 2.0 can actually be more difficult to use than its predecessor. Previously, all you needed to do was create two versions of an image and choose Export; now you have to choose Simple Rollover from a pop-up window in the Behaviors palette and then use the Hotspot tool to create an area that overlays your image.

However, Fireworks 2.0 does correct one of the earlier version's major shortcomings: you can now section your document into multiple image files, a feature that gives designers much greater freedom and can also speed page loading. Sectioning a document is simple—just place guides at key points on your image and choose the Slice Along Guides option in the Save dialog box. You can also slice your document into bits, using the Hotspot tool to create areas you can export as individual files.

Two other new features make Fireworks more useful for Web animators. An onionskinning box in the Frames palette lets you preview the position of images in other frames of an animation, and a set of VCR-style controls at the bottom of the document window lets you quickly view animations without opening the Export window. Because the program still lacks any sort of tweening capabilities, however, you have to create even simple animations one frame at a time.

Macworld's Buying Advice

If Fireworks 1.0 won the battle of the Web graphics tools by a nose, version 2.0 is out in front by several lengths. If you buy only one Web graphics tool, Fireworks 2.0 is the one to get.—JASON SNELL

RATING: ♦♦♦♦ **PROS:** Solid export features; powerful drawing tools; can apply multiple styles to an object. **CONS:** No tweening capability; creating simple rollovers is more difficult than in previous version. **COMPANY:** Macromedia (800/457-1774, www.macromedia.com). **COMPANY'S ESTIMATED PRICE:** $199.

Bryce 4

3-D SCENE GENERATOR KEEPS GETTING BETTER

METACREATIONS' BRYCE BEGAN its existence as a fun way to create both natural- and alien-looking 3-D landscapes, not as a serious application for creative professionals. But with its intuitive interface, powerful texture-generating functions, and ultrarealistic rendering capabilities, Bryce has become a useful tool for many 3-D pros while remaining approachable for hobbyists. Version 4 doesn't add any earth-shattering new features, but it does offer refinements that should please both groups of users.

Playing Mother Nature

If you've never known Bryce's charms, this 3-D rendering and animation program lets you create realistic—or surrealistic—landscapes with relatively little effort. Drop in a terrain, apply a stony texture, and choose a sky preset, and you can produce an eye-catching mountain scene within a few minutes. You can also set up keyframe animations in which objects move as a virtual camera flies through the landscape. It's all done within a well-conceived, if quirky, interface that does a good job of shielding novices from the program's underlying power.

Starry Night Bryce 4's new Sky Lab lets you create star fields, comet showers, and other heavenly effects.

This version's predecessor, Bryce 3D, represented a quantum leap over Bryce 2, adding animation functions and a faster rendering engine. Bryce 4 is a more evolutionary upgrade. Graphics pros will most appreciate Bryce's new import and export functions, especially the ability to import scenes and objects from NewTek's LightWave 3D. You can also bring in U.S. Geological Survey digital elevation files to re-create real-world terrains. And you can export textured Bryce terrains in a variety of popular 3-D formats (Bryce can export other models, but the method is a little cumbersome).

Kiss the Sky

Perhaps the biggest addition to Bryce 4 is the new Sky Lab, which offers fine control over the sun, moon, and atmospheric elements (see "Starry Night"). You can add star fields or comets; change the moon phase; and determine the appearance of clouds, fog, and haze. A preview window lets you see the effect quickly rendered within your scene or against a neutral background, and a timeline in the dialog box can animate sky movement.

Along with the new Sky Lab, Bryce 4 features several enhancements to the Terrain Editor, one of the program's longtime strengths. Via a pop-up menu, you choose from a variety of terrain styles, such as rolling hills and lava flows, to use as a basis for your own topologies. A helpful new tiling feature automatically removes seams between adjacent terrains. You can also apply Adobe Photoshop filters to terrain maps; the software ships with a selection of filters from MetaCreations' Kai's Power Tools 3.

Render Me This

Bryce's ray-tracing engine is a double-edged sword. On the plus side, it produces incredibly realistic imagery. On the downside, it can be painfully slow on an older Power Mac, although G3s handle the rendering process reasonably well. If you plan to do serious animation with Bryce, a G3 is a necessity: a 50-frame, 320-by-240-pixel QuickTime movie that rendered in 70 minutes on a Power Mac G3 took 9 hours on a 604e system.

Fortunately, Bryce offers several options to speed rendering. New in this version is a nifty rendering brush that lets you selectively render a scene by painting into it. It works much like a progressive JPEG image, spraying a pattern of dots until it has completely rendered the area. As with the rendering engine, it performs much better on a Power Mac G3 than on an older 604e system.

Also new is a timesaving *nano-preview* that lets you create quick versions of your animations at thumbnail size. In addition to showing the actual animation, the program displays each frame in a storyboard, so you can render scenes selectively. It would be nice if you could drop every *n*th frame to save time, but the preview is reasonably fast even on a 604e system.

Aside from the nano-preview, Bryce's keyframe animation features haven't changed from the previous version's. Setting up an animation is easy: you can have the program add keyframes as you move the camera and objects, or you can add the keyframes yourself. But there's also a lot of power here: you can animate almost any aspect of a camera's or object's movement, and edit the motion paths within the scene or in the program's Motion Lab.

Bryce's texture-generation features also remain unchanged from the previous version's, but that's nothing to complain about; the program has long had one of the most powerful texture generators of any 3-D software. You can choose from dozens of realistic preset textures, with lots of options for modifying the presets or creating new ones.

Macworld's Buying Advice

Bryce 3D, which added animation capabilities and a speedier rendering engine, was a huge advance over the previous version. Bryce 4 is a much more modest upgrade. Animators will appreciate the timesaving nano-preview, and 3-D pros will like the new import and export capabilities. But aside from the Sky Lab, there are no major additions here—just refinements to what was already a powerful and easy-to-use 3-D landscape generator.—STEPHEN BEALE

RATING: ♦♦♦♦ **PROS:** Easy to use; powerful texture- and terrain-editing features; realistic ray-tracing engine. **CONS:** Slow rendering on older Power Macs. **COMPANY:** MetaCreations (800/472-9025, www.metacreations.com). **LIST PRICE:** $249.

Adobe Photoshop Plug-ins

PHOTOGRAPHICS AND 3D INVIGORATOR ADD HEFTY GRAPHICS CAPABILITIES

ADOBE PHOTOSHOP HAS MUCH pixel-pushing prowess, but some tasks fall far beyond its native capabilities. Extensis's PhotoGraphics and Zaxwerks' 3D Invigorator are plug-ins designed to bring vector and 3-D graphics tools, respectively, to the Adobe Photoshop workbench. Each product succeeds—although not completely—as a quick-and-dirty replacement for stand-alone graphics software.

Vectors to Go

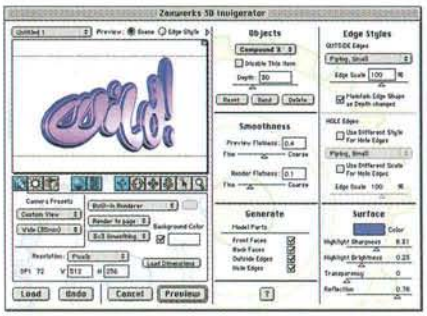
PhotoGraphics is a straightforward vector-based drawing program. It provides a reasonable selection of basic shape tools, a well-implemented Adobe Illustrator–style path tool, and a powerful text tool. You can choose from multiple levels of antialiasing and create objects with varying degrees of transparency.

The plug-in's professional type-formatting functions should appeal to designers who have struggled with Photoshop's text limitations. You can set up character style sheets, adjust horizontal and vertical scaling, apply superscripting and subscripting, and specify different colors for characters in the same text block. PhotoGraphics also offers an effortless text-on-a-path function, letting you place type along the edge of any shape or curve created with the plug-in. The latter feature might be reason enough for some designers to get the package.

Much like Illustrator and Macromedia Freehand, PhotoGraphics lets you group text and graphics into layers, a useful feature for managing complex illustrations. If you're still using Photoshop 4, you'll appreciate the plug-in's close approximation of a permanently editable type layer.

When you save a PhotoGraphics drawing within Photoshop, the vector objects convert into bitmaps, but the Photoshop file also retains the vector data. At any time, you can reopen the file (as long as PhotoGraphics is installed), edit, and rerasterize the objects—a tremendous boon to any Photoshop artist.

PhotoGraphics doesn't replace a dedicated illustration program, but having vector tools available in Photoshop is a great time-saver. Our biggest gripe is that you must create all objects within PhotoGraphics—you cannot import graphics from other programs, even using the Clipboard. We'd also like to see a larger variety of editing functions, such as basic distortion tools.



Reaching for New Depths 3D Invigorator packs many controls into a small amount of screen space.

Into the Third Dimension

Moving into the realm of texture and depth, 3D Invigorator lets you import EPS and PostScript graphics and extrude them into realistic-looking 3-D objects without using an external rendering program. Once you import the 2-D graphic, it immediately shows up in the main editing window, with a surprisingly rich set of camera, lighting, and rendering controls. The plug-in supports compound objects, permitting properly rendered holes, as in the *O* or *D* characters.

If you have QuickDraw 3D installed in your system, you can see a very fast shaded preview of the image. You can rotate, scale, and edit the object, with rapid previews of adjustments even on a garden-variety 604e Mac (G3 Macs update the display instantly). The fast preview capability is critical, because the plug-in's controls provide many ways to tweak the object. In addition to the quick shaded view, you can also display a wire-frame representation or full render preview.

The flexibility of shading and extrusion options will please even experienced 3-D artists. The plug-in also offers a huge selection of beveling styles. You can edit any existing bevel shape and specify different bevels for the holes in an object. However, you cannot set different bevels for the front and back faces of an extruded object, a surprising and seemingly arbitrary limitation.

The plug-in's speedy renderer supports soft shadows, spotlights, environment maps (to enhance the realism of shiny metal textures), and more. One feature that should find its way into other 3-D software is the ability to view a scene from the perspective of a light source, a great way to see a spotlight's target. You place the final rendered image on the currently active Photoshop layer.

The sheer number of editing controls may overwhelm the 3-D neophyte, but the interface is well organized and visually effective, delivering substantial functionality in a minimal amount of screen real estate.

Macworld's Buying Advice

Mac artists who already own good 2-D illustration and 3-D rendering software might find these plug-ins redundant. In addition, 3D Invigorator is expensive, considering that you can buy a full-featured 3-D program such as Ray Dream Designer for about the same price. Nevertheless, both plug-ins extend the reach of Photoshop in ways truly useful for creative professionals.—DAVID BIEDNY

3D Invigorator

RATING: ♦♦♦♦ **PROS:** Rich set of bevel styles; good lighting controls; fast renderer. **CONS:** Expensive; interface overwhelming at times. **COMPANY:** Zaxwerks (800/549-0250, www.zaxwerks.com). **COMPANY'S ESTIMATED PRICE:** $199.

Extensis PhotoGraphics

RATING: ♦♦♦♦ **PROS:** Powerful text tool; easy to use; retains vector graphics within Photoshop files. **CONS:** Limited tool selection; no import capabilities. **COMPANY:** Extensis (800/796-9798, www.extensis.com). **COMPANY'S ESTIMATED PRICE:** $150.

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Headline Studio

POWERFUL BUT FLAWED WEB ANIMATION TOOL

CREATING ANIMATED GIF IMAGES for the Web—especially for banner advertisements—has always been a chore. Newer Web graphics tools such as Macromedia FireWorks and Adobe ImageReady can help, but only to a limited extent. MetaCreations' Headline Studio 1.0 offers more power and control than those programs, but a strange interface and some unfortunate feature omissions prevent it from living up to its potential.

Ersatz Interface Although Headline Studio's interface superficially resembles the Mac's, cursor movements are sluggish and you can't see other applications through the textured background.

It's All about Banners

First off, let's make it clear what Headline Studio is *not*—it's neither a cel-animation tool nor a utility for optimizing GIFs or JPEGs. Instead, Headline Studio is designed to create animations that involve text. Translation: it primarily targets people who create animated banner ads.

Although Headline Studio's features are geared toward manipulating text, they also work on imported images and shapes drawn within the program. Using Headline Studio's floating palettes, you can adjust the tracking and leading of text; stretch, skew, and color both text and objects; and alter any text or object's opacity. The result: Headline Studio makes it relatively easy to produce animated text that grows, skews, bounces, and even dances across the screen letter by letter.

But Headline Studio's animation effects really kick in when you manipulate the timeline in the program's Animation palette. For example, you can set an object to appear a certain way at the beginning of your animation, then reposition the timeline indicator and change the object's properties—say, turn black text a fiery red. Headline Studio automatically calculates the difference between your object's initial characteristics and the new ones you've given it, and animates the transformation.

Other Web graphics tools support tweening, but those programs are frame-based—you choose the number of frames you want in your animation and then specify an action to take place over the course of those frames. With Headline Studio, you don't have to specify the number of frames in your animation until you save it as a GIF image. That means you can view smooth transitions while you're building your animations, before you decide how many frames to export based on the target size of the final GIF file.

Although Headline Studio's lack of reliance on frame-by-frame animation gives you a degree of flexibility other products can't match, it still pays to plot every step of your animation in advance. Once you've created an object and animated it, it can be difficult to make changes without affecting the rest of the animation. Another drawback is that you can't add more time to an animation at the beginning or end.

In general, working in Headline Studio takes some getting used to. Like other MetaCreations products, it doesn't use the standard Mac interface. For example, each antialiased window casts a shadow on a textured background that fills the screen, and because there's no way to turn off the background, you can't see any other program's windows while you're working in Headline Studio.

Some of Headline Studio's text-manipulation tools are also frustrating. Rather than clicking on the Text tool and then on the text you want to edit, you select the Arrow tool, click on the text box you want to edit, and *then* select the Text tool. And you can't specify point sizes: you enter text at a large size and then use the Scale tool to shrink it down to a more appropriate size.

No App Is an Island

Nowhere is Headline Studio more clearly a version 1.0 product than when it comes to importing and exporting. Shockingly, you can't paste images into Headline Studio from the Clipboard; to use an Adobe Photoshop image, you need to save it as a GIF, JPEG, or TIFF file—the only formats Headline Studio accepts—and then import it.

Once you're ready to export your animation, you'll run into one of Headline Studio's most glaring weaknesses. Although you can choose the number of frames to include in the file, the program renders those frames by spacing them equally throughout the animation; it makes no attempt to figure out where to place the frames based on the action. To make complicated animations both attractive and relatively compact, we had to export enormous GIFs from Headline Studio, open them in another GIF editor, trim unnecessary frames, and adjust the pause between other frames. In addition, Headline Studio gives you only limited control over the color palettes it uses when exporting GIF files.

Macworld's Buying Advice

Headline Studio lets you create complicated, visually interesting animations quickly. If you spend most of your time creating animated ad banners, you'll find this program an impressive addition to your toolbox. By reducing an animator's reliance on frame-by-frame GIF animation, Headline Studio may revolutionize the way people design animated GIFs. But for now, its interface limitations and weak export features get in the way of its potential.—JASON SNELL

RATING: ♦♦½ **PROS:** Powerful, simple animation controls; lack of reliance on frame-by-frame animation techniques. **CONS:** Nonstandard interface; weak export features. **COMPANY:** MetaCreations (800/846-0111, www.metacreations.com). **COMPANY'S ESTIMATED PRICE:** $199.

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*Stanford Resources, Inc. Quarterly Monitrak Report Q4 '98 and Display Search Quarterly Supply vs. Demand Study: LCD Monitors, Q1 '99.

Accel-a-Writer 3G

LASER PRINTER DOUBLES AS A DESKTOP IMAGESETTER

XANTÉ'S ACCEL-A-WRITER 3G looks like any other laser printer, but behind the beige exterior lies a technological breakthrough: a $6,045 desktop device that can produce four-color separations of surprisingly good quality. It has some limitations, but publishers with relatively modest quality requirements may find the Accel-a-Writer 3G a cost-effective replacement for their service bureau's imagesetter. (Xanté also offers a version for screen-printing applications.)

Based on a Fuji Xerox engine, the 3G can function as a tabloid-format monochrome laser printer. But Xanté has boosted the resolution to 2,400 dpi and added other enhancements that make the printer suitable as a color-separation device. You can produce separations up to 13 by 35.5 inches with halftone screen frequencies as high as 175 lines, although Xanté recommends it primarily for frequencies of 100 to 133 lines. The printer includes a PostScript 3 interpreter licensed from Adobe Systems.

Here's how it works: you produce color separations as reverse negatives on Xanté's

SUZANNE ROADY

Myriad polyester film. Then you run the negatives through the included FilmStar 2 processing unit to increase the toner density. The result is a set of process-color separations that you can use to produce plates or film proofs.

Macworld Lab tested the printer by producing CMYK separations of one of the magazine's covers at 150 lines per inch. We then generated a Matchprint proof from the polyester film and compared the proof with the printed cover. We were pleasantly surprised by the results: although some headlines appeared thicker in the Matchprint than in the original, image quality was excellent, with sharp detail and reasonably accurate color.

The biggest problem with the Accel-a-Writer 3G is the odor. Because the processor uses a rather foul-smelling chemical solution to prepare the film, you'll need to house it in a *very* well ventilated space. Surprisingly, Xanté says that the solution has no special disposal requirements, unlike the chemicals used to process traditional imagesetter film: you can dump the Accel-a-Writer's solution down the drain.

Aside from the smell, working with the film processor is messy. You'll need to drain and replenish the FilmStar solution once every 50 tabloid prints; one $34.95 bottle is good for three refills. You also need to immerse the film in distilled water to speed drying time (normally three to four hours).

Macworld's Buying Advice The Accel-a-Writer 3G isn't for everybody. If you publish a slick consumer magazine or other material that requires top-notch image quality, you should probably stay with a high-end imagesetter. However, if you produce a publication with relatively modest quality requirements, the Accel-a-Writer 3G is a cost-effective means of producing color separations.—STEPHEN BEALE

RATING: ♦♦♦♦ **PROS:** Great color separations for the price. **CONS:** Processing unit uses foul-smelling chemical. **COMPANY:** Xanté (800/926-8839, www.xante.com). **COMPANY'S ESTIMATED PRICE:** $6,045.

TurboMax

AFFORDABLE ALTERNATIVE TO SCSI

HARD DRIVES WITH ENHANCED Integrated Drive Electronics (EIDE) connections are popular in the PC market, but the EIDE standard never caught on in the Mac market. Now, thanks to a new PCI card from ProMax Technology, Mac users can take advantage of inexpensive EIDE drives just like their PC counterparts.

The TurboMax/ATA-33 PCI card, combined with a pair of 16GB hard drives, gives you 32GB of storage for less than half the cost of a comparable SCSI setup. ProMax is targeting the system at price-sensitive digital-video producers, but it's a great deal for many other Macintosh users as well. ProMax offers the card separately or as part of an $825 configuration that includes two IBM 16GB Ultra ATA DMA drives and Adaptec's Remus Lite software (the price varies slightly from computer to computer due to differences in cables).

EIDE hard drives are much less expensive than SCSI drives, but the technology has some limitations. The two Ultra ATA connectors on the TurboMax card support only two devices each, for a total of four

GIBSON

drives. In a four-drive configuration, two drives must be set up as *masters* and the other two as *slaves*. As you add slave devices, the system slows down. In our tests, a configuration with two master drives was generally 10 percent faster than a master-and-slave configuration.

The card connects only to internal drives, and does not work with all EIDE drives. However, you can ensure compatibility by ordering drives through ProMax.

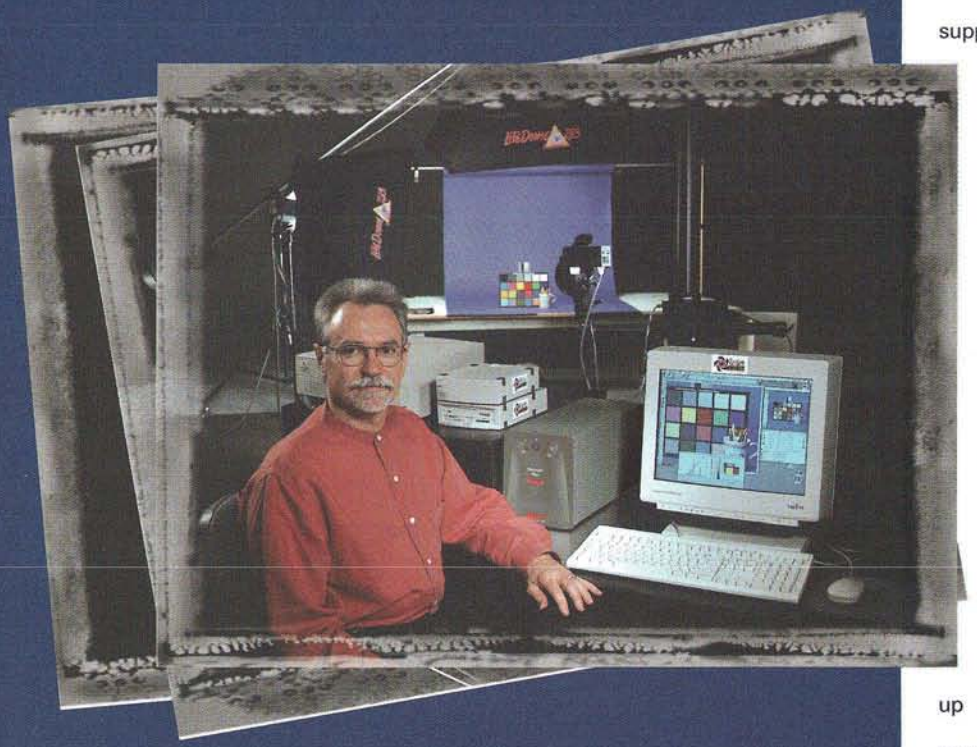
The TurboMax proves that EIDE is plenty fast in a two-drive array. The card's 24-MBps sustained throughput won't match the 80 MBps of the fastest SCSI, Ultra 2 LVD, but it's faster than the built-in SCSI on most Macintoshes. When writing data, the two-master array was twice as fast as the built-in 4GB Wide Ultra SCSI drive in our original Power Mac G3/300. When reading data, the array's performance was close to that of the built-in SCSI drive. The array did particularly well in the MacBench 1MB sequential write test, indicating that it would be good for digital-video applications and for moving large files.

Installing internal drives takes a steady hand and nimble fingers. Luckily, ProMax provides good printed instructions. The drives come preconfigured as master devices. Changing them to slaves requires moving tiny jumpers. Drives attached to the card appear as SCSI devices. You can use the drives with such Macintosh utilities as Norton Utilities and Apple's Disk First Aid.

Macworld's Buying Advice While EIDE is not as versatile or expandable as SCSI, it offers a great price/performance ratio. If you need extra storage and don't mind the delicate work of installing internal drives, the TurboMax card and a couple of inexpensive Ultra ATA drives represent a deal that's hard to beat.—KRISTINA DE NIKE

RATING: ♦♦♦½ **PROS:** Impressive speed at an affordable price. **CONS:** Limited drive selection; assembly required. **COMPANY:** ProMax Technology (800/977-6629, www.promax.com). **LIST PRICE:** $129; 32GB configuration, $825.

What does a digital photographer do in the middle of a lightning storm?



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iMac 333MHz

APPLE BOOSTS CONSUMER MAC'S SPEED

APPLE'S CANDY-COATED iMAC, now equipped with a 333MHz PowerPC CPU, is faster than ever, yet the new version carries the same $1,199 price tag as the previous 266MHz model. But CPU speed is just one factor that influences overall system performance, and while this new model is faster than earlier iMacs, it's no match for a 333MHz Power Mac G3. In Macworld Lab's Processor test, we found that it barely kept up with Apple's blue Power Mac G3/300MHz (see "Faster iMac").

Rapid Transit?

Apple's blue 300MHz G3 systems feature a 150MHz cache bus and a 100MHz system bus. The new iMac, in contrast, sports a 133MHz cache bus and a 66MHz system bus. In plain English, this means Apple's high-end G3 systems feed data to the CPU at a higher rate. The new iMac gives you a 333MHz CPU, and it's considerably faster than its predecessor, but as you can see in the MacBench 5.0 Processor scores, its CPU performance is comparable to that of the 300MHz reference system.

Aside from the faster processor, the new-model iMac offers the same design and features as the previous model. It still costs only $1,199 and sports the same 6GB hard drive and 32MB of RAM (expandable to 256MB). Like the previous 266MHz iMac, it features a built-in 15-inch, 1,024-by-768-pixel display; a 24× CD-ROM drive; 10/100BaseT Ethernet; a 56-Kbps modem; an ATI Rage Pro graphics accelerator (with 6MB of SGRAM); and two USB ports.

Beyond the specs, the new iMac shares the same strengths and weaknesses as the old one—these computers still suffer from limited expandability and an unergonomic mouse. Although Apple has yet to replace this oddly shaped input device, a tiny indentation on the mouse button helps you figure out

SUZANNE ROADY

which end is up. On the plus side, the iMac is easy to use, features a colorful design, and offers enough computing power for just about any task you'd want to perform at home or in the office.

Macworld's Buying Advice

With its powerful CPU and affordable price, the 333MHz iMac remains the leader among consumer PCs. Aside from its lack of expansion options, it continues to be the computer that dares to be different.—ALLYSON BATES

RATING: ♦♦♦♦ **PROS:** Great value; creative design; faster performance. **CONS:** Limited expansion; difficult mouse. **COMPANY:** Apple Computer (800/795-1000, www.apple.com). **LIST PRICE:** $1,199.

Macworld LAB TEST

Faster iMac

Best results in red. *Reference systems in italics.* **MacBench 5.0 scores are relative to those of a first-generation Power Mac G3/300, which is assigned a score of 1,000 for each test.**

MACBENCH 5.0

	Processor	Disk	Graphics
Apple iMac 333MHz	925	1,376	1,439
Apple Power Mac G3/300MHz (blue)	*926*	*1,272*	*2,604*
Apple iMac 266MHz	*801*	*1,356*	*1,436*

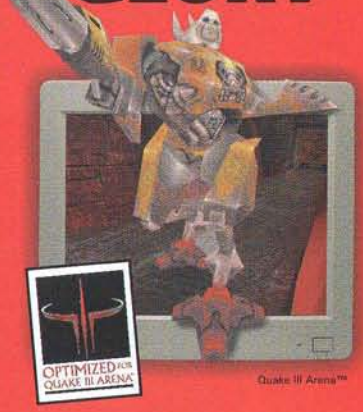
Longer bars are better.

Behind Our Tests

For detailed information on our tests, see the full review online, at www.macworld.com/1999/07/reviews/.—**Macworld Lab testing supervised by Gil Loyola**

GUTS

GLORY



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Adobe GoLive 4.0

NEW OWNER, NEW VERSION, FEW REAL CHANGES

WHEN ADOBE ACQUIRED GoLive earlier this year, users were awaiting a minor update from version 3.1 to 3.5 of GoLive's flagship product, GoLive CyberStudio. Adobe has since renamed both the product and the update, releasing the new Adobe GoLive 4.0. Despite the somewhat misleading version-number jump, GoLive 4.0 breaks little new ground—adding mostly bugfixes and feature refinements—and falls behind its chief competitor, Macromedia's Dreamweaver 2, in innovation.

Making Movies The biggest new feature in Adobe GoLive 4.0 is the dubious ability to create QuickTime movies inside the program.

The primary new feature in GoLive 4.0 is an integrated QuickTime editor that lets you create and edit QuickTime movies, modify existing movies, and apply any of the built-in QuickTime 3.0 transitions and filters. You can work with audio, video, and URL tracks in a timeline, and you can preview your movies within GoLive. Although the QuickTime editor works as promised, GoLive has only a fraction of the abilities of Adobe Premiere or After Effects; it's hard to see a compelling reason for including a watered-down video editor in a Web-page–creation tool.

On a more positive note, GoLive 4.0 improves on its predecessor's already excellent site-management features, with a better site map, enhanced updating of links, and better support for absolute URL paths. The new version can also manage hyperlinks within PDF files on your site. And GoLive now plays nice with non-HTML code such as XML. Earlier versions either reparsed and damaged such code or required you to put **<NOEDIT>** tags around code you wanted to protect; GoLive 4.0 simply marks the code as foreign and leaves it unchanged.

The update includes 14 new JavaScript actions that let you do useful things such as create and delete cookies, build slide shows, and control how content appears in frames. You can also create external JavaScript library files shared by and called from different pages in your site, reducing the amount of code per page and helping pages load faster. Although JavaScript-savvy users can write new actions, GoLive's extensibility lags far behind that of Dreamweaver, which lets you write JavaScript and HTML to create custom menu commands, inspector palettes, and other objects.

GoLive's table editing has also improved, although you still can't give a table a background image, apply predetermined table styles, or sort the table's contents as you can in Dreamweaver. On the other hand, GoLive can create tables from delimited text files, a feat Dreamweaver can't match.

The new version's stability and speed are an improvement over those of the shaky 3.1 version, although some users still report problems with FTP uploading to Web servers. GoLive's connections are sometimes less than robust, and the program can disconnect prematurely from the remote server.

Macworld's Buying Advice

Although Dreamweaver has pulled ahead in some areas, Adobe GoLive 4.0 is a good bet if you're looking to invest in a professional Web tool. The improved table editing and JavaScript actions are welcome, as is the program's newfound resistance to crashing. But for loyal CyberStudio users, the $99 upgrade fee for such a minor update is a harsh introduction to the Adobe family.—TOM NEGRINO

RATING: ♦♦♦♦ **PROS:** Better table editing; improved handling of foreign code; expanded suite of JavaScript actions; better stability. **CONS:** Poor value for upgrade price; out-of-place QuickTime editor; minor bugs. **COMPANY:** Adobe Systems (800/685-3612, www.adobe.com). **COMPANY'S ESTIMATED PRICE:** $299.

GUTS

GLORY

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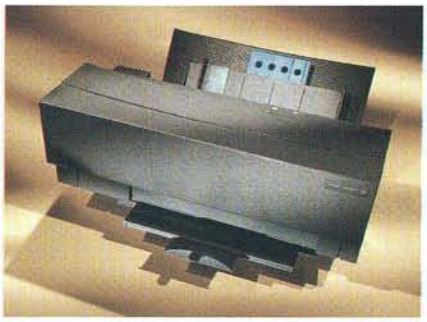
Alps MD-5000

VERSATILE COLOR PRINTER IS A LITTLE PRICEY

HIGH-QUALITY INK-JET PRINTers are getting a lot of attention these days, and with good reason. But other printing technologies exist, and the Alps MD-5000 is a good example of an alternative that delivers functionality comparable to that of the latest photo-quality ink-jets.

Using ribbons coated with a special ink-saturated resin, the MD-5000 offers several unique features, including metallic and spot colors and the ability to print glossy images on plain paper. Although the printer delivers good quality, its relatively high price may lead some users to opt for a lower-cost ink-jet model.



ARNOLD TIOSEIO

The MD-5000 is compact and easy to set up, although you'll need Alps's $98 SCSI connection kit to use the printer with your Mac. At present, there's no option for directly connecting to the iMac or the new blue-and-white Power Macintosh G3, unless you've installed a SCSI card or USB-to-SCSI adapter.

You can install up to seven cartridges, allowing you to apply special inks or coatings in addition to the manufacturer's MicroDry CMYK process colors. For example, the VPhoto Primer undercoat lets you print photographic images on copier-grade paper or preprinted letterhead with the same quality you'd expect from expensive specialty papers. Other cartridges provide spot colors, glossy overcoats, opaque white and metallic inks, and gold and silver foil.

These specialty ribbons are ideal for creating eye-catching presentations, invitations, or greeting cards. In addition, the overcoat and foil cartridges let you create mock-ups of varnished or foil-stamped output. The ribbons cost between $7 and $12; the price per page is comparable to that of most ink-jets.

When printing with standard MicroDry inks on Alps's photographic paper at its full 2,400-dpi resolution, the MD-5000 does a great job. Colors are well saturated and reasonably accurate. However, the output in this mode is not truly photorealistic; photos print with the kind of visible line screen you might see in a magazine halftone. Although the effect is no more pronounced than the dot patterns four-color ink-jet printers produce, the output lacks the photographic quality of the newer six-color ink-jet models, such as Epson's Stylus Photo series.

For true continuous-tone photographic output, you'll need Alps's $100 dye-sublimation kit, which produces images with a level of sharpness and color saturation we've not seen in other dye subs. However, we saw some minor banding on a few isolated prints.

Alps claims the printer's output is waterproof, smear-proof, and fade-proof. It's too soon to tell how well the images stand up to sunlight, but unlike the output from most ink-jets, images from this printer are definitely waterproof and smear-proof. The MD-5000 produces some of the sturdiest digitally printed images we've seen.

Macworld's Buying Advice

The MD-5000 produces durable output, and the company's specialty ribbons offer printing options not available with today's popular ink-jet models. But these features carry a price. With photo-quality six-color printers going for less than $300, paying $700 or more (depending on options) for comparable output is difficult to stomach. If you simply need photo-quality prints, a less-expensive ink-jet is a better value. But if you're looking for durable output, need to proof foil-stamped print jobs, or want to produce near photo-quality images on regular paper stocks, the MD-5000 is a good choice.—BEN LONG

RATING:: ♦♦♦♦ **PROS:** Versatile, durable output; good photo quality with dye-sub option. **CONS:** Expensive. **COMPANY:** Alps Electric (800/825-2577, www.alps.com). **COMPANY'S ESTIMATED PRICE:** $599; Mac connection kit, $98.

GUTS

GLORY

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FriendlyNet Dual 56K and ISDN

EASY INTERNET ACCESS FOR WORKGROUPS

A SLEW OF COMPANIES ARE SHIPping Internet-access products aimed at SOHO users. Among them is Asanté, with two variations on a theme: the FriendlyNet Dual 56K and ISDN multiuser Internet-access servers. The former has two built-in V.90 modems and a serial port for a third, for up to 168 Kbps of raw bandwidth; the latter sports an ISDN port running at up to 128 Kbps. Both are easy to install in small workgroups, but since the 56K model costs $150 more than competing dual-modem products, the ISDN product is a better performer for the money.

The two boxes look identical, each consisting of a four-port Ethernet hub and two analog phone ports for sharing lines with voice or fax gear. The Dual 56K's Web-based administration makes for easy setup, although it lacks password protection. It gives you ready access to all configuration options and status information, and a wizard mode steps you through configuration. The ISDN unit requires that you install a wizard application that, under OS 8.5, displays blotchy and misplaced text (Asanté acknowledges the cosmetic glitches and says they'll be fixed in a future release).

Both devices use Dynamic Host Configuration Protocol to configure the TCP/IP settings automatically for your hosted computers, whether they're Macs or PCs. Both also use Network Address Translation, so you need only one dynamic IP address from your ISP. On-demand routing initiates dial-up to the Internet whenever a user on your LAN needs access; when traffic warrants, the unit dials up a second (or third, in the case of the Dual 56K) connection.

With either device, you can run Internet-accessible TCP/IP servers, using port mapping to connect incoming connection requests to the appropriate server computer on your LAN. The ISDN model has the added advantage of arbitrary IP packet filtering and routing, useful features for larger organizations. It also supports Telnet remote administration, although neither unit can be managed remotely with SNMP. And neither has dial-in support for telecommuters, a feature found in most competing products.

In Internet download tests, the ISDN model trounced the Dual 56K unit, even when the latter used all three modems. When a single user performs operations that require just one TCP/IP connection, the modem unit can use only a single 56K modem, while the ISDN unit can run at full speed (128 Kbps). Multiple users bring up multiple connections, so the modem model is still effective at providing shared access for several users.

ARNOLD TIOSEJO

Asanté Technologies' FriendlyNet ISDN

Macworld's Buying Advice

If you can get ISDN, FriendlyNet ISDN is the way to go, despite its more difficult setup; you get better performance for less money. If ISDN isn't available, the FriendlyNet Dual 56K is an option—just not a very competitive one.—MEL BECKMAN

FriendlyNet Dual 56K

RATING: ♦♦½ **PROS:** Web-based administration; built-in Ethernet hub; inbound Internet server mapping. **CONS:** Expensive; no remote dial-in capability; no LAN password protection; no SNMP or other remote management. **COMPANY:** Asanté Technologies (800/662-9686, www.asante.com). **LIST PRICE:** $799.

FriendlyNet ISDN

RATING: ♦♦♦ **PROS:** Built-in Ethernet hub; special application support; IP packet filtering and routing; inbound Internet server mapping; Telnet remote management. **CONS:** No Web-based administration; no remote dial-in capability; no SNMP remote management. **COMPANY:** Asanté Technologies (800/662-9686, www.asante.com). **LIST PRICE:** $738.

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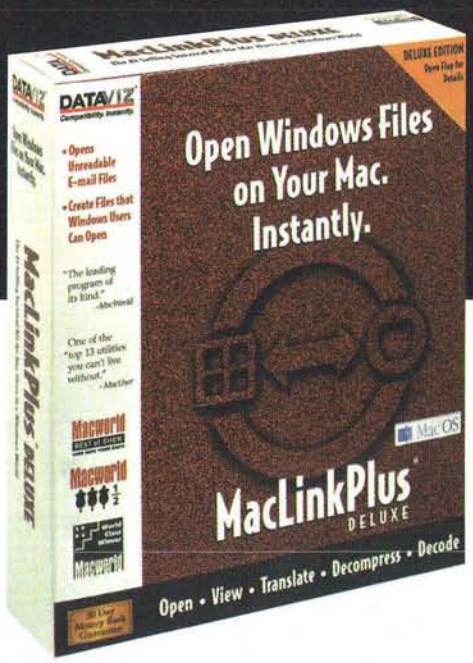

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Amapi 3D 4.1

POWER BURIED UNDER ODD INTERFACE

BUILDING ON THE MODELING prowess that has brought the program a small but loyal following, the latest version of TGS's Amapi 3D offers a number of enhancements and adds rendering features. But Amapi 3D 4.1, like its predecessors, takes a decidedly nonstandard approach to interface design—one that will likely get in the way of productivity for many aspiring 3-D artists.

When you open Amapi, you quickly realize that in regard to interface design, icons are not always better than words. Often-inscrutable icons surround the main working view (a full-screen perspective on the 3-D space). You can't customize the icons, and although you can choose a more "standardized" interface mode, this simply places the default tool icons into a tool bar with no clear organization. Color coding the icons and offering pop-up labels showing the tools' names would go a long way toward making the program more usable.

Amapi organizes tools into three general categories: construction (for creating primitives and surfaces from scratch), modeling (for manipulating surfaces and vertices), and assembly (for moving, scaling, and other editing operations). This scheme is somewhat confusing—for example, creating NURBS (nonuniform rational B-splines) objects is a modeling operation, yet the NURBS tool is in the construction category. Once you get accustomed to this approach, however, you'll find a fairly powerful set of modeling tools, including advanced NURBS and surface-generation capabilities. Boolean and trimming tools let you fine-tune a model's shape and edge characteristics, and the mold tool offers a "vertex magnet" for the virtual clay-style editing of a shape. The advanced modeling tools are limited, though; you can't change a polygonal shape into a NURBS shape, for example, and NURBS-based objects often convert during the editing process into less accurate polygons.

Tools in Space Amapi 3D 4.1 can help you create complex models such as this fighter-plane body, but the cluttered interface is a bit *too* bleeding-edge.

Version 4.1 includes a host of new rendering features, such as OpenGL support and texture mapping for objects, but you'll likely still want an external, full-featured rendering and animation package. The program is somewhat sluggish, even on a fast G3 system, and prone to crashes. The documentation could use some editing, and the online help requires launching a Web browser—not an option if you need to devote all your available memory to Amapi itself.

Macworld's Buying Advice Those with some 3-D experience may be able to figure out Amapi 3D 4.1's operational intricacies, but such users may be happier with the more capable (and more expensive) form-Z, from autodessys. Those new to 3-D are better off with a more straightforward package, such as MetaCreations' Infini-D or Play's Amorphium.—DAVID BIEDNY

RATING: ♦♦♦ **PROS:** Extensive surface-editing tools; powerful Boolean capabilities; new rendering features. **CONS:** Nonstandard interface; sluggish performance. **COMPANY:** TGS (800/544-4847, www.tgs.com). **LIST PRICE:** $399.

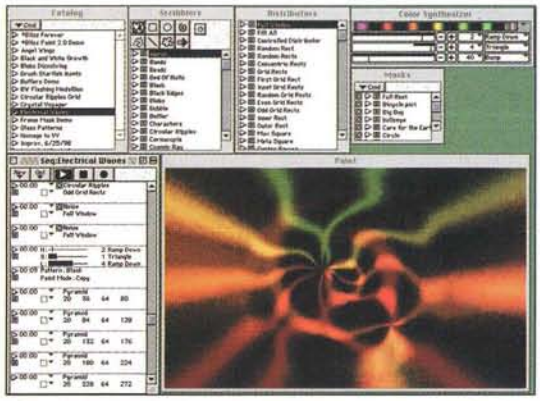
BlissPaint 2.0

UNIQUE TOOL FOR COLOR ANIMATION

EVERY SO OFTEN A PROGRAM comes along that defies easy categorization, and Imaja's BlissPaint 2.0 is such a beast. This wildly flexible color-animation program lets you not only create special effects and save them as QuickTime movies, but also use live audio and video to control animations. Thanks to the unique Color Synthesizer and the variety of animated brush shapes and filters, there's nothing else quite like it.

BlissPaint works its magic by playing combinations of brush effects, called Scribblers. Scribblers range from animated brushes, fractals, geometric shapes, concentric circles, and paint blobs to distortion, mirroring, and noise filters. The variety is overwhelming, especially when you consider that you can also use live video input and still images (but not QuickTime movies, unfortunately) as source material. And version 2.0 lets you customize the Scribblers' parameters; real-time control mapping allows you to change any Scribbler parameter based on, for example, mouse movement or the volume of a live sound input.

You define how an animated Scribbler appears on the screen using Distributors. You can arrange combinations of Scribblers and Distributors in the Sequence window, to build a list of events to play back sequentially. You can also control how colors change over time by combining Color Synthesizer settings—for 8-bit color palette cycling—with the other events in the Sequence window.



Blissed Out BlissPaint 2.0 lets you process some straight lines with a ripple effect, add a noise Scribbler or two, and throw in an animated color palette to create slick QuickTime effects.

But the most magical aspect of BlissPaint is that it's the only Mac program that can save dynamic 8-bit palette animations as QuickTime movies, so you can export BlissPaint animations into video-editing and -effects programs such as Adobe Premiere and After Effects. You can even use live video and audio to control BlissPaint—as the music gets louder, for example, animated color effects become more saturated.

The only drawbacks are that the program doesn't include printed documentation and ships on floppy disks (though Imaja will burn you a CD-ROM at no additional charge if you request it when you place your order).

Macworld's Buying Advice When you combine an almost endless array of animated brushes and effects with extensive color controls and programmability, you end up with a truly one-of-a-kind program. BlissPaint 2.0 just may be the best special-effects bargain on the block.—DAVID BIEDNY

RATING: ♦♦♦♦½ **PROS:** Extensive brush effects; powerful color-animation options; can save animations as QuickTime movies. **CONS:** No printed manual; can't use QuickTime movies as source material. **COMPANY:** Imaja (800/294-6252, www.imaja.com). **LIST PRICE:** $150.

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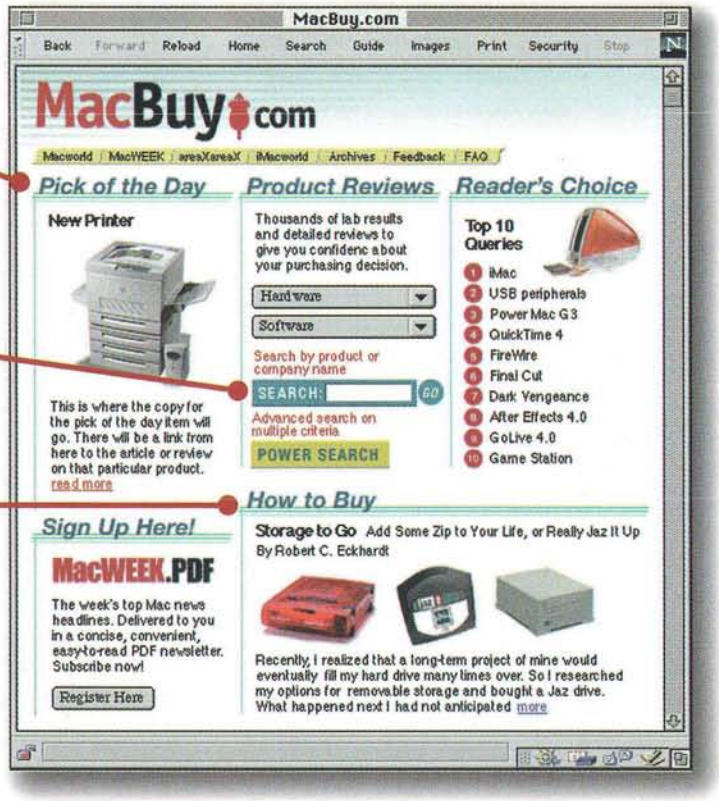

From the publishers of Macworld magazine

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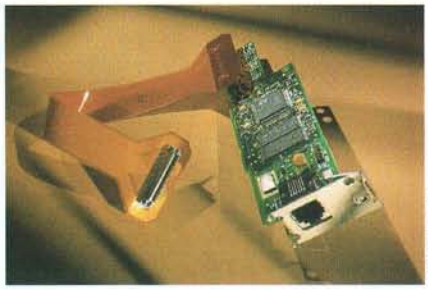
TelePort 56K Internal Modem

MODEM PUTS FINISHING TOUCH ON LATEST POWER MAC G3S

APPLE'S LATEST POWER MACINtosh G3 systems are marvels of engineering, offering blazing speed, fast USB and FireWire interfaces, Rage 128–accelerated graphics, and an exquisitely friendly case design. Alas, Apple left out an internal modem, and because the blue-and-white G3s don't have serial ports, you can't use an existing RS-232 serial modem. Boca Research has jumped into the gap with the Global Village TelePort 56K Internal Modem, which plugs into the new G3s' internal communications slot rather than taking up a precious PCI slot. And it supports the latest V.90 56K standard, making it compatible with virtually all 56-Kbps Internet services—including the older K56flex and x2 standards.

Installation is easy, especially given the G3's convenient fold-down door. You plug in the card and a ribbon cable, close up the G3, and reboot to install the software (which includes Global Village's excellent GlobalFax 2.6.6). An installation wizard then helps you configure the modem's options.

The TelePort 56K operates like all the other modems in Boca's Global Village line



ARNOLD TIOSEJO

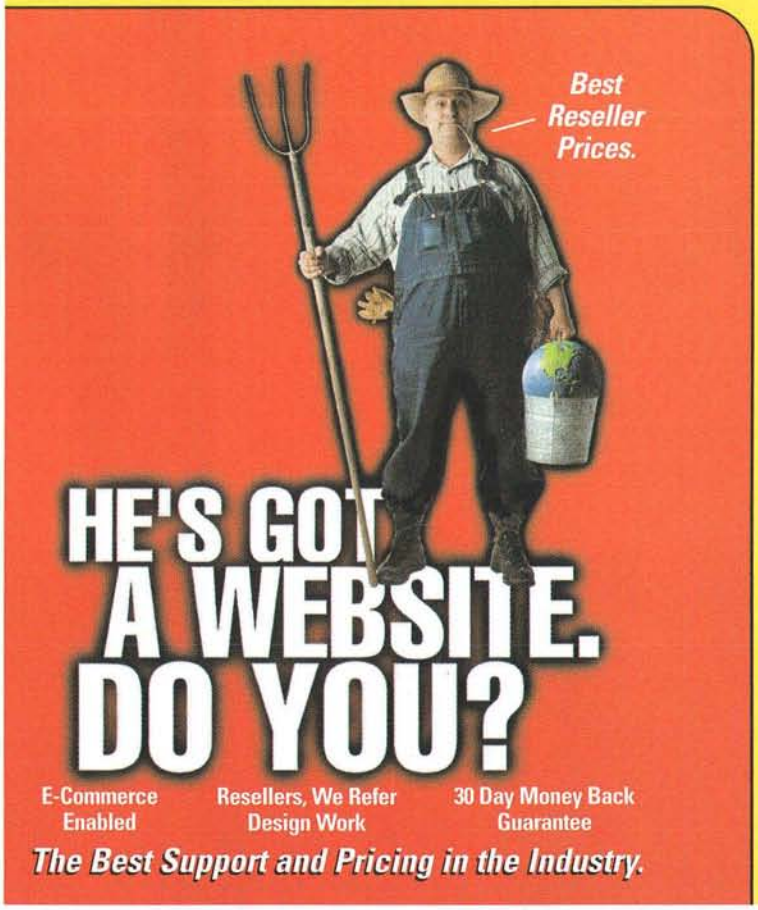
(except that, unlike the external modems, it doesn't have a second phone port for a telephone or fax machine and doesn't support automatic voice/fax switching). A control panel lets you set various configuration options, including port speed and data compression, while the GlobalFax application gives you access to send and receive settings as well as to in- and out-box queues. When the modem is operating, a menu bar displays throughput and gives you quick access to connect and disconnect controls.

GlobalFax lets you send faxes from within any application by holding down the option key when printing. An address-book utility pops up to let you address your fax, compose a cover page, and select fax quality options. GlobalFax can receive faxes, too; it includes a fax browser for viewing and printing received fax pages. This version of GlobalFax supports drag-and-drop fax transmission but lacks the OCR option some earlier versions of GlobalFax included.

Because the modem uses the G3's internal communications slot rather than an RS-232 serial port, it can use data compression to operate at throughputs of 230 Kbps, compared with 112 Kbps for serial-port–attached modems. The modem tested well with a variety of ISPs, connecting easily to V.90, K56flex, and x2 providers.

Macworld's Buying Advice If you've got one of the new G3s and need a modem, you can either buy a new USB-compatible external modem or go with Boca's less expensive, less cumbersome internal one (the only internal modem available at press time). The only thing you'll miss with the TelePort is voice/fax switching.—MEL BECKMAN

RATING: ♦♦♦♦½ **PROS:** Easy installation; excellent fax software; inexpensive. **CONS:** No voice/fax switching; fax software lacks OCR component. **COMPANY:** Boca Research (800/336-2009, www.globalvillage.com). **LIST PRICE:** $159.



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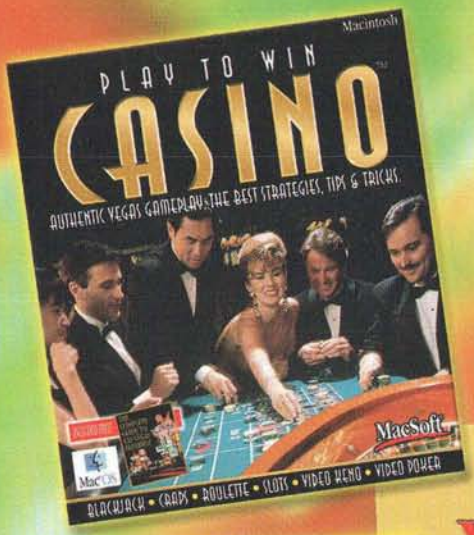

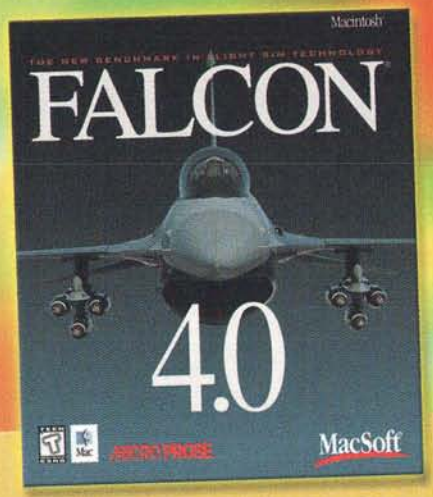

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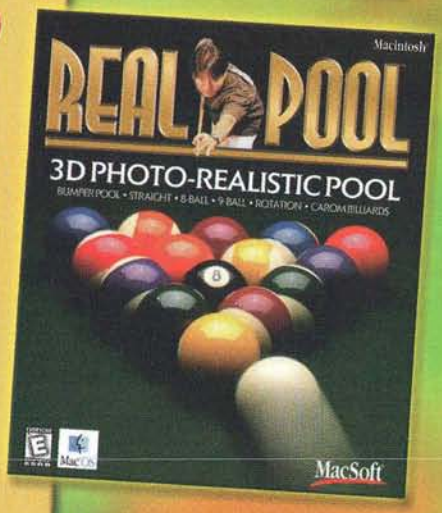

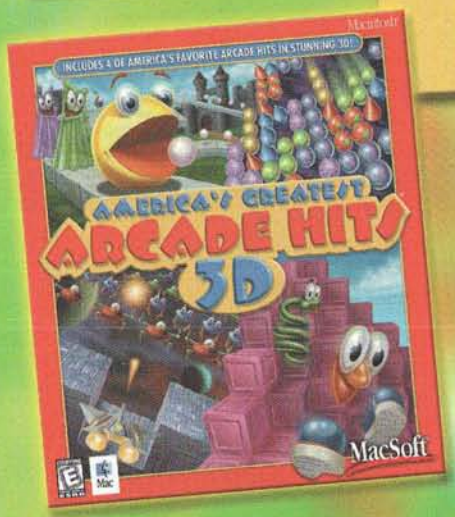

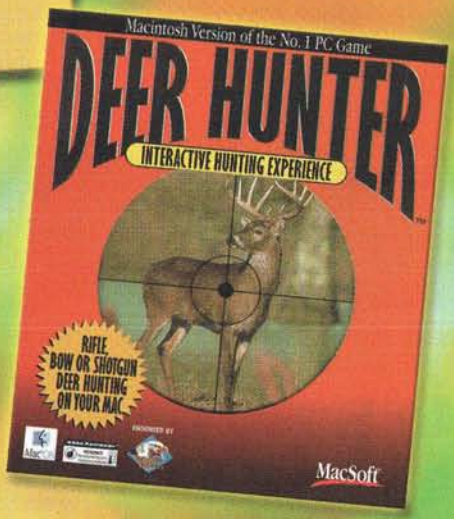

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Spring Cleaning 3.0

CLEANUP UTILITY CLEANS ITSELF UP

THE CONCEPT IS COMPELLING: a product called Spring Cleaning that sweeps out your hard disk, deleting duplicate files, trashing orphaned aliases and preferences, and nuking empty folders. As attractive as the prospect sounds, however, the first two versions of the program suffered from a convoluted design, a sloppy manual, and a tendency to trash good files along with the bad. Fortunately for us, Aladdin Systems obviously intends to keep at it until getting it right. In Spring Cleaning 3.01, the company has dramatically simplified the interface and improved the documentation. The new release is the best yet, although the goal of perfect System Folder junk identification continues to elude the program.

You can search for such unwanted items as broken aliases; orphaned documents; and corrupted files, fonts, and help files. Once Spring Cleaning produces its list of such items, you must choose how you want them handled. Sometimes these actions make sense—for example, you can archive the items with Aladdin's StuffIt or move them to the Trash. At other times, the options are just goofy: Why would you want to use a Duplicate command on files you found with the duplicate-file search? And how exactly are you supposed to use the Launch command on empty folders?

Trim the Fat Spring Cleaning 3.01's Fat App Slimmer can shave dozens of megabytes of redundant code from your fat binary programs.

One welcome command is Exclude From Future Searches, which prevents Spring Cleaning from repeatedly rounding up the same incorrect sets of files. But although the program is smarter than before, it still makes mistakes. For example, the duplicate finder turns up many files that are obviously not duplicates, and the preferences trasher targets for deletion files that are actually extremely important, such as your Internet dial-up number and other control-panel settings.

Fortunately, Spring Cleaning 3.01 offers safety mechanisms that prevent the kind of tragedy previous versions occasionally engendered. When you delete an application, for example, the associated-files list still includes documents you've created with that application, but Spring Cleaning now identifies them as such. And many of the actions can now be undone, thanks to the new Restore command.

Macworld's Buying Advice Despite the obvious attention Aladdin has paid to the new version's design, Spring Cleaning remains caught in a conceptual bind: it's most likely to attract novices longing for some automatic genie to cure their troubled systems, yet only advanced users should be armed with a program that requires item-by-item scrutiny. In other words, Spring Cleaning 3.01 does an excellent job of parading suspects into your courtroom, but it's still your job to separate the innocent from the guilty.—DAVID POGUE

RATING: ♦♦♦½ **PROS:** Dramatically improved interface; smarter than before. **CONS:** Some options are illogical; not for beginners. **COMPANY:** Aladdin Systems (800/850-3388, www.aladdinsys.com). **LIST PRICE:** $50.

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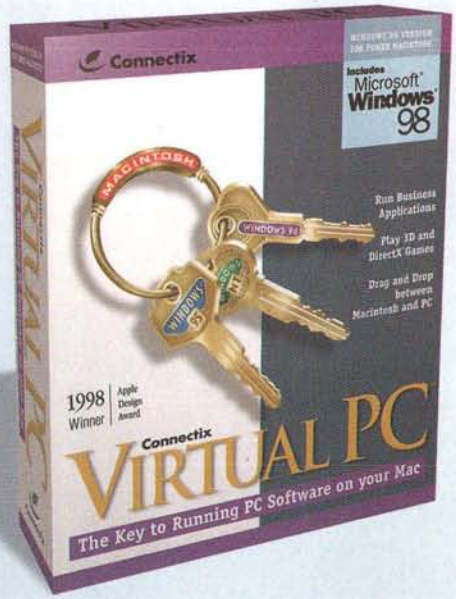

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Cruise Control

PUT YOUR MAC ON AUTOPILOT

NO MATTER HOW MUCH YOU enjoy using your computer, some jobs—backing up your hard drive or scanning for viruses, for example—are always pure drudgery. Walnut Systems' Cruise Control 1.0 promises to simplify your life by letting you program agents that perform basic Macintosh operations, including copying or moving files, launching or quitting applications, making aliases, and emptying the Trash. On newer Macs, you can also turn the computer on or off, wake it up, or put it to sleep. With its optional extension loaded, Cruise Control doesn't even have to be running for agents to work. And since Cruise Control runs on 68020 systems and uses less than 2MB of RAM, it's an ideal application for that old Mac IIcx gathering dust in the closet.

In addition to Cruise Control's standard suite of actions, agents can execute compiled AppleScripts, so they can control any scriptable application indirectly. If you're not familiar with AppleScript, a handy option lets you create agents that record and execute macros. The first time through, the agent records all your cursor movements, mouse-clicks, and keystrokes, which it then replays on subsequent passes. Unfortunately, you can't edit macros, and they won't work predictably if any windows change position between executions.

Cruising Along Dragging an item to the Calendar window creates an agent that opens the item.

Cruise Control offers two options for triggering agents. Calendar agents, as their name implies, run at specified times and days (see "Cruising Along"). Idle agents execute whenever the Mac has been inactive for a specified period of time. (You can indicate whether you want idle agents to monitor the mouse and keyboard, disk drives, or network for activity.) For added flexibility, you can constrain either type of agent to run only during a specified range of times, dates, or days of the week. For example, you can limit an agent that appears on the calendar every weekday to running only on Mondays. But there's no convenient way to force agents to trigger at odd intervals—say, the third Friday of every month.

Like any new program, Cruise Control suffers from a few rough edges. For example, you can record agents' actions in a log, but you have to create the file and drop it into the System Folder yourself. And while the manual covers basic operations adequately, it needs more-practical examples.

Macworld's Buying Advice Unless you know AppleScript or you can make do with its relatively simple macros, Cruise Control's repertoire of actions may seem somewhat limited. But Walnut Systems plans to offer additional scripts and plug-ins that extend the program's capabilities, and third parties may do the same. If you routinely perform repetitive tasks that don't require any interaction, Cruise Control is worth a look.—FRANKLIN TESSLER

RATING: ♦♦♦½ **PROS:** Simple interface; minimal hardware requirements. **CONS:** Limited macros and repeat options. **COMPANY:** Walnut Systems (800/945-8024, www.walnutsys.com). **LIST PRICE:** $99.

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BookEndz

POWERBOOK G3 DOCK WORKS, BUT IS IT WORTH THE PRICE?

WHEN A RECENT *MACWORLD* feature proclaimed the PowerBook G3 series "desktop invaders" that threatened to replace deskbound computers, we weren't kidding. These days, many Mac users (including some *Macworld* editors) use a PowerBook as their primary Mac for both home and work. But it's a bit inconvenient to plug in an assortment of cables every time you connect your PowerBook at your desk, then detach them when you're ready to go; it would be better to plug all those cables into a dock (much like Apple's old Duo Dock), then insert or remove your PowerBook with one easy motion.

That's the idea behind Newer Technology's BookEndz dock (available not only for the PowerBook G3 but also for several other models). Unfortunately, the dock doesn't offer enough convenience to justify its lofty price tag. Unless you've got a cable for almost every port on your PowerBook, the BookEndz simply won't save you much time.

Made of black plastic that matches the PowerBook G3, the BookEndz is the width of a PowerBook and slightly longer. To dock your PowerBook, you set it (with the port door open) on the flat part of the BookEndz and slide it into the dock's back end, which contains plugs that match up with every port on the PowerBook. Once ensconced in its new home, the portable is connected to anything you've attached to the ports on the back of the dock.

In addition to replicating all of your PowerBook's ports, the BookEndz adds a few clever extras—composite-video out; RCA audio out; and a standard 25-pin SCSI port (found on most desktop Macs) rather than the square, compact PowerBook SCSI connector. The feet on the bottom of the dock ensure that your PowerBook doesn't slide around on the desk—a problem if you find yourself wanting to reposition your PowerBook occasionally.

Although attaching a PowerBook to a BookEndz dock requires less movement than attaching all the cables directly to the PowerBook, it really isn't much of a time-saver. And because the BookEndz dock fits so snugly to the back of the PowerBook, you may have to spend some time pushing on your PowerBook until the two devices are fully connected.

Macworld's Buying Advice The BookEndz isn't without some nice features. If you fill up most of the ports on your PowerBook, you may find it saves you some time. If you'd prefer not to fuss with a SCSI adapter or want to take advantage of the dock's audio- and video-out converters, the BookEndz can be useful—although a low-cost adapter could work just as well. The bottom line: if you're willing to spend $249 to save a few seconds of plugging and unplugging devices every day, that's your choice. It just doesn't seem particularly prudent to us.—JASON SNELL

ARNOLD TIOSEJO

RATING: ♦♦ **PROS:** Can save some time if you connect a lot of cables to your deskbound PowerBook. **CONS:** Expensive. **COMPANY:** Newer Technology (316/943-0222, www.newertech.com). **COMPANY'S ESTIMATED PRICE:** $249.

OUR EDITORS CAN BEAT UP THEIR EDITORS

MATTHEW ROTHENBERG
Director of Online Content, Mac Publishing L.L.C.

INDUSTRY EXPERIENCE
Joined *MacWEEK* in 1990

Broke scoops on Apple's first Power Macs and successive models as well as its first scanners, cameras and color printers; Adobe's Photoshop 5 and K2 DTP packages; QuarkXPress 4.0; and innumerable other products.

Ran *MacWEEK's* print-news operation, then led its transition from print to the Web.

BACKGROUND
Traded in his manual typewriter for a state-of-the-art Mac SE in 1988. Bitten by the DTP bug, Matthew paid his dues as a publishing consultant before breaking into MacWEEK's mail room. Matthew has served MacWEEK as a speaker and agent provocateur at industry trade shows across the United States and Europe.

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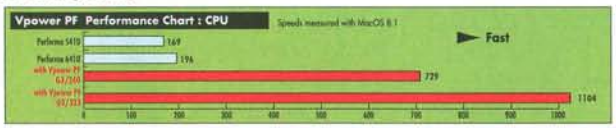

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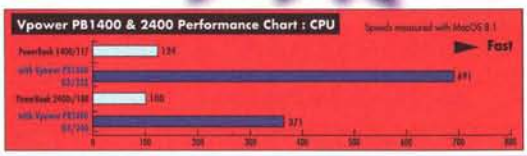

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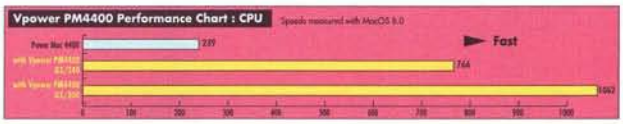

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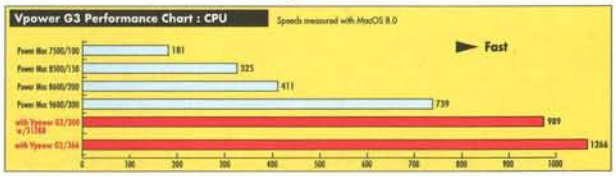

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The Game Room

Instant Access

VIRTUAL GAME STATION ADDS STACKS OF HOT GAMES TO THE MAC'S ARSENAL

by Christopher Breen

Provided that the Y2K yahoos are wrong and the earth doesn't shatter into a gazillion pieces at 12:01 a.m. on January 1, 2000, that fateful year will bring us not only a merciful end to the incessant play of The Artist Formerly Known As Prince's song "1999" but a new census as well. Considering that this will be the first demography of the twenty-first century, I'd like to suggest that we ditch the hoary "What's your ethnic origin, and how often do you bathe in a week?" queries and instead pigeonhole the population by modern means. For example, I'd offer this far more telling categorization: "Your electronic-gaming input device of choice is (A) a game pad or (B) a keyboard?"

The answer to this single question reveals both age range and disposition. Those who choose answer A fall within the arcade/console game generation (ages roughly 7 to 26)—a population of twitchy individuals who are easily startled. The B group includes more-mature gamers (read: geezers) who think that computer gaming reached its zenith in the mid-1980s with Leather Goddesses of Phobos.

Although, ahem, barely into my prime, I must admit that the mix of games in my library tends to gravitate toward adventure and strategy games rather than the scoot-and-shoot stuff that sends kids skittering into their doctors' offices with repetitive strain injuries. Still, when Connectix announced Virtual Game Station (VGS), an emulator that allows Macs to play Sony PlayStation games, I used every fast-twitch muscle in my body to get that thing installed so I could take it for a test drive. (And a good thing, too: Sony recently won a court decision charging Connectix with violating intellectual property rights, forcing it to stop selling VGS until further notice. Connectix is appealing the decision, however, so hopefully VGS will be available again before too long.)

I wanted to know if I, a veteran gamer, could find true happiness playing these arcade-style games. As it turns out, yes, I could. But that happiness didn't come simply from firing up the software and shoving any old PlayStation game into my PowerBook G3. What follows are a few lessons I learned along the way.

JAMES YANG

Lesson 1: Gain the Upper Hand

If you're used to controlling the action on a real PlayStation, you'll likely feel that the way VGS maps the PlayStation buttons to your Mac's keyboard is completely goofy. By default, the four points of the direction pad are assigned to the up, right, down, and left arrow keys; the triangle, circle, X, and square buttons are assigned to I, L, K, and J, respectively; select is mapped to the B key; start to the N key; and the L1, L2, R1, and R2 buttons use the 1, 2, 9, and 0 keys, respectively. In English, that means that the default setup forces you to control the direction pad with your right hand and the command buttons with your left—completely counter to the way things are configured on a PlayStation. To put things right, run, don't walk, to VGS's Preferences (found in the Edit menu) and change the Controller 1 assignments so that the direction pad uses W, D, S, and A for north, east, south, and west, respectively (see "Take Control").

Lesson 2: Keyboard Controls Stink

Now that you've memorized VGS's keyboard assignments, forget them. If you want the real PlayStation experience, get a game pad. Part of the pleasure of playing these games is digging your thumbs into the game pad as you twist and turn it in vain attempts to beat the tar out of Mortal Kombat's overmuscled galoots. A keyboard just doesn't have this kind of mobility—and frankly, even if you rigged some kind of duct-tape–and-harness affair, you'd look darned silly waving a keyboard around.

When purchasing a game pad, try to find one that mimics a PlayStation controller rather than one that employs the Nintendo design. Nintendo-style controllers lack the L2 and R2 buttons and have six buttons bunched together on the right side of the controller. Gravis's $29.99 GamePad Pro USB (800/235-6708, www.gravis.com) is modeled on PlayStation controllers and includes a little screw-in joystick for the direction pad.

continues

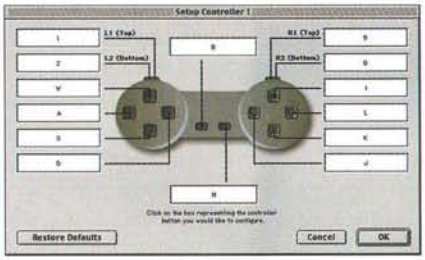
The GamePad Pro USB is fine, but I prefer using the controller that came with the genuine PlayStation that sits atop my television. To use such a controller, you need Kernel Productions' $49.95 JoyPort adapter (302/456-3026, www.kernel.com). This little black box allows you to connect PlayStation, Atari, Genesis, and Nintendo controllers to your Mac. As we go to press, only the ADB version of the JoyPort is available, but a USB model is due soon. Those who just can't wait for the USB model and have extra money to spend on this stuff can use the ADB version in conjunction with Griffin Technology's $49 iMate USB-to-ADB adapter (615/255-0990, www.griffintechnology.com).

Lesson 3: Lower Your Expectations

If you're accustomed to playing games such as Myth and Unreal on your Mac and think all games should be so graphically glorious, you're in for a rude awakening when you launch your first PlayStation game. PlayStation graphics are blocky and pixelated compared to those of modern computer games. If you want to get in on the action, however, you'll just have to learn to live with it.

Lesson 4: Try Before You Buy

Unlike computer games, you can rent PlayStation discs, and I heartily recommend doing so. Connectix maintains a Web site that lists PlayStation games compatible with VGS (www.virtualgamestation.com/games.html), but it's still a good idea to try a game first. To begin with, you'll see just what kind of glitches pop up—even compatible games occasionally skip a frame or lose bits of sound. More important, you'll discover whether you actually like the game. For example, Sierra Online's PC game NASCAR Racing—1999 Edition is just outstanding, and I'd hoped Electronic Arts' NASCAR 99 would be as good. A five-dollar rental from Blockbuster proved it wasn't. Granted, NASCAR 99 wasn't recommended as compatible, and for good reason—it suffered lots of frame skips and audio glitches. But I also thought the graphics were unimpressive, and I found it next to impossible to control my stock car with a game pad.



Take Control For easier keyboard control, set this configuration in VGS's Preferences.

The Final Lesson

Even after these hard-won lessons, it's unlikely that I'll count myself among the game-pad generation. I still favor games that don't require the kind of finely tuned reflexes found only among those who aren't yet old enough to drive a real car on a real road. But the fact that my Mac can now run so *many* different games (more, dare I say, than my PC-wielding contemporaries?) leaves me with a deep sense of satisfaction. So what if my fingers don't fly like those of the generation issued game pads at birth? Thanks to Virtual Game Station, my PowerBook G3, and a few select games, I can still party like it's 1999. **m**

The Contributing Editor Formerly Known As CHRISTOPHER BREEN will, from this day forward, be referred to as *Macworld*'s Game Guy.

It Ain't Myth on a Mac

... *but It Ain't Bad*

THERE ARE MORE THAN 1,000 PLAYStation games, and I'd be lying if I said that I've tried even a tenth of them. But I've spent enough time standing in line at Blockbuster and twitching my trigger finger to make a few recommendations.

CRASH BANDICOOT: WARPED
Steve Jobs chose this Sony (800/345-7669, www.playstation.com) game to demo VGS at last January's Macworld Expo, and for good reason—it's one of the best-looking PlayStation titles around. The $40 game is a richly realized twitchfest that will easily eat up your next cross-country flight (and a couple of PowerBook batteries).

GRAN TURISMO
I maintain that driving a race car with a game pad is like painting a portrait with a push broom, but if you must do so, Sony's $30 Gran Turismo is a good way to go. The game includes both arcade and "realistic" modes and performs well under VGS emulation.

METAL GEAR SOLID
Konami's (650/654-5687, www.konami.com) sneak-around-to-avoid-the-bad-guys game has received rave reviews from the console crowd. The story line is compelling, and the graphics are good for a PlayStation title. This $49 game requires reasonable reflexes as well as the ability to solve problems.

NCAA FOOTBALL 99
For reasons best known to Electronic Arts (800/245-4525, www.ea.com), sports games are all but unknown on the Macintosh. At least, they were until Virtual Game Station came along. This $49.95 football sim is one of the best out there, and it plays well under emulation.

THE ODDWORLD GAMES
I've got a soft spot for GT Interactive's (800/610-4847, www.oddworld.com) Oddworld duo—Abe's Oddysee ($19.99) and Abe's Exoddus ($44.99). These humorous Prince of Persia–style run, jump, and puzzle games are nicely rendered and feature a bizarre cast of characters.

Get in the Game Clockwise from top: Abe's Exoddus, Crash Bandicoot: Warped, and Gran Turismo.

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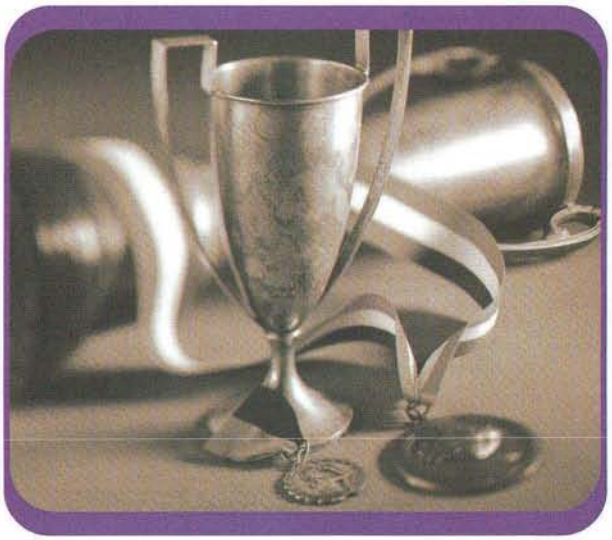

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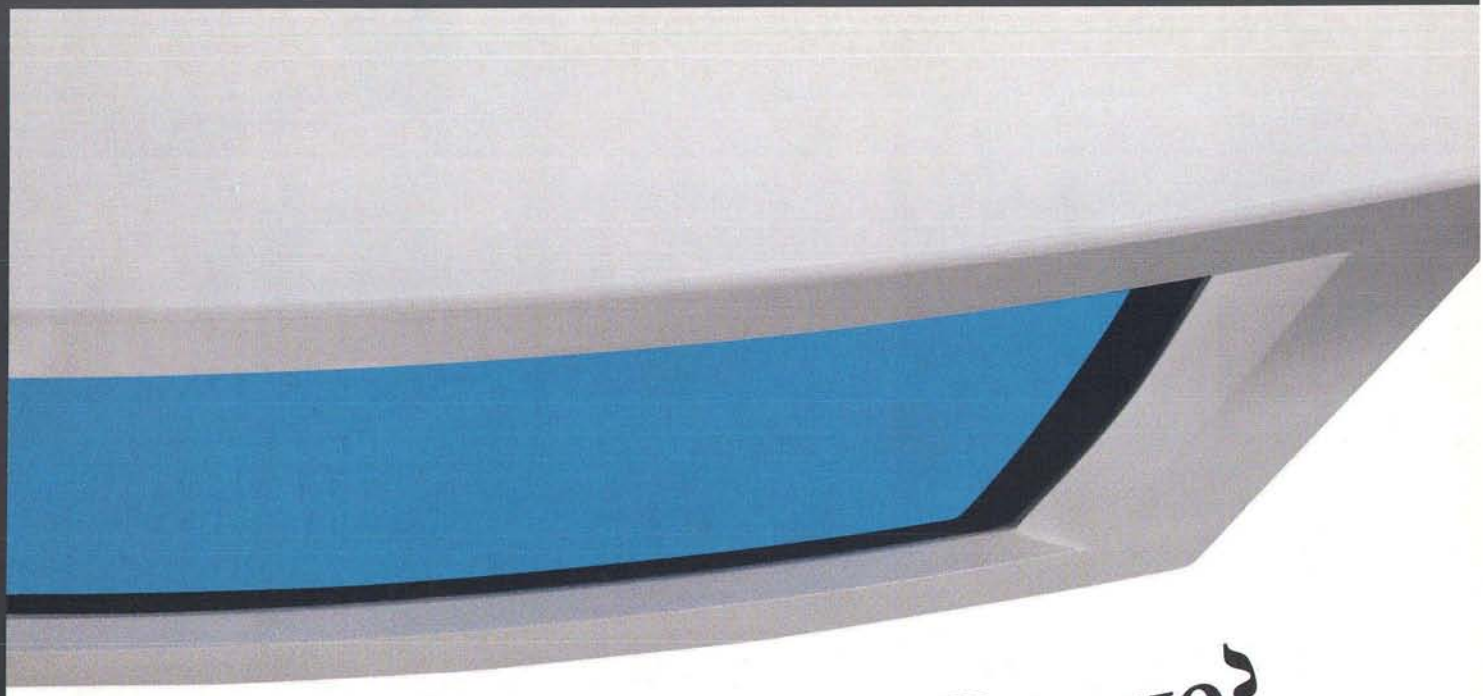

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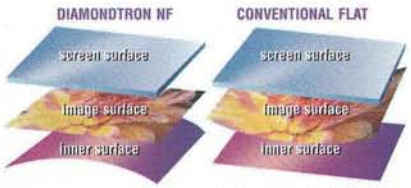

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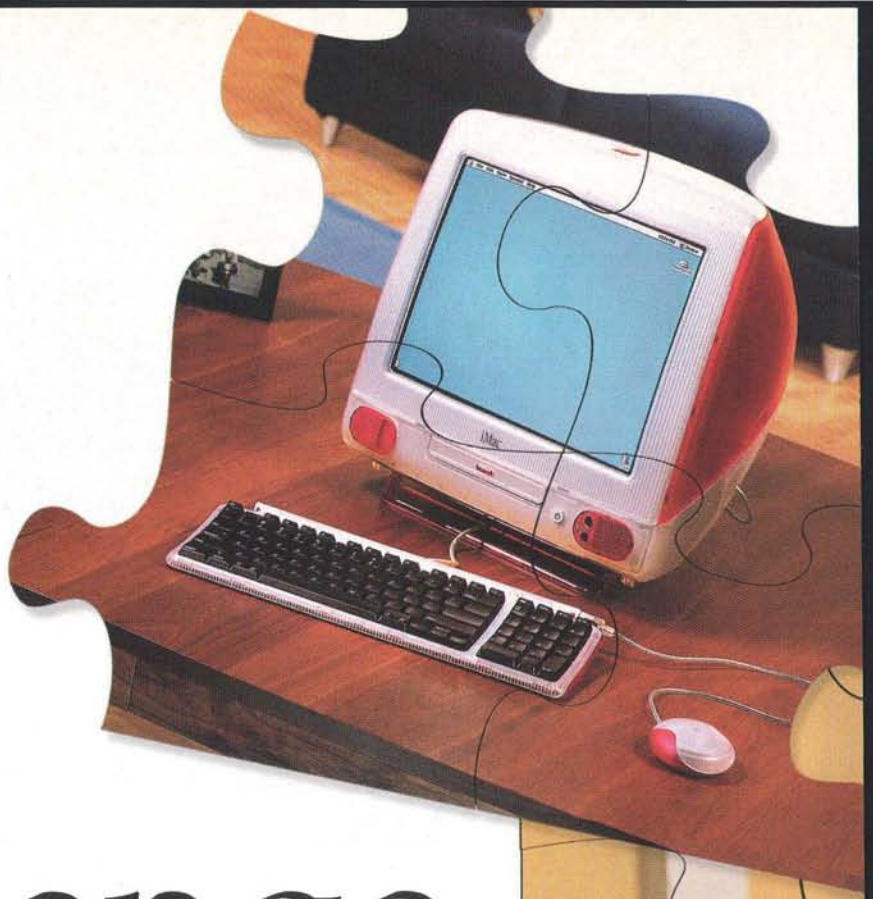
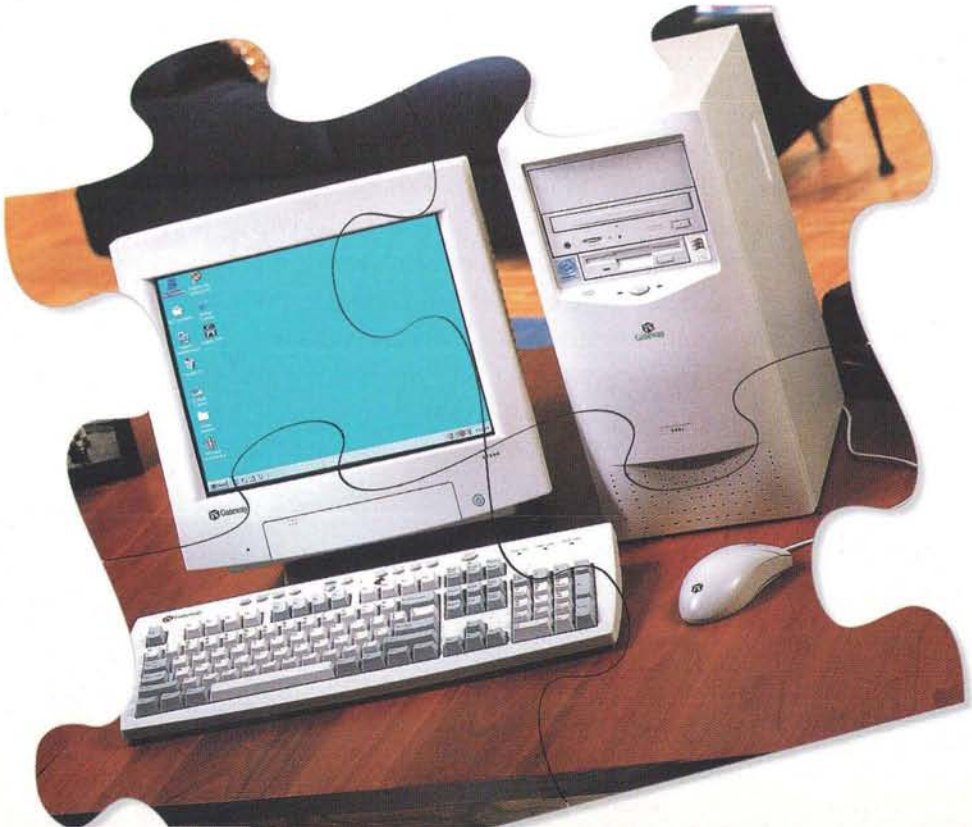
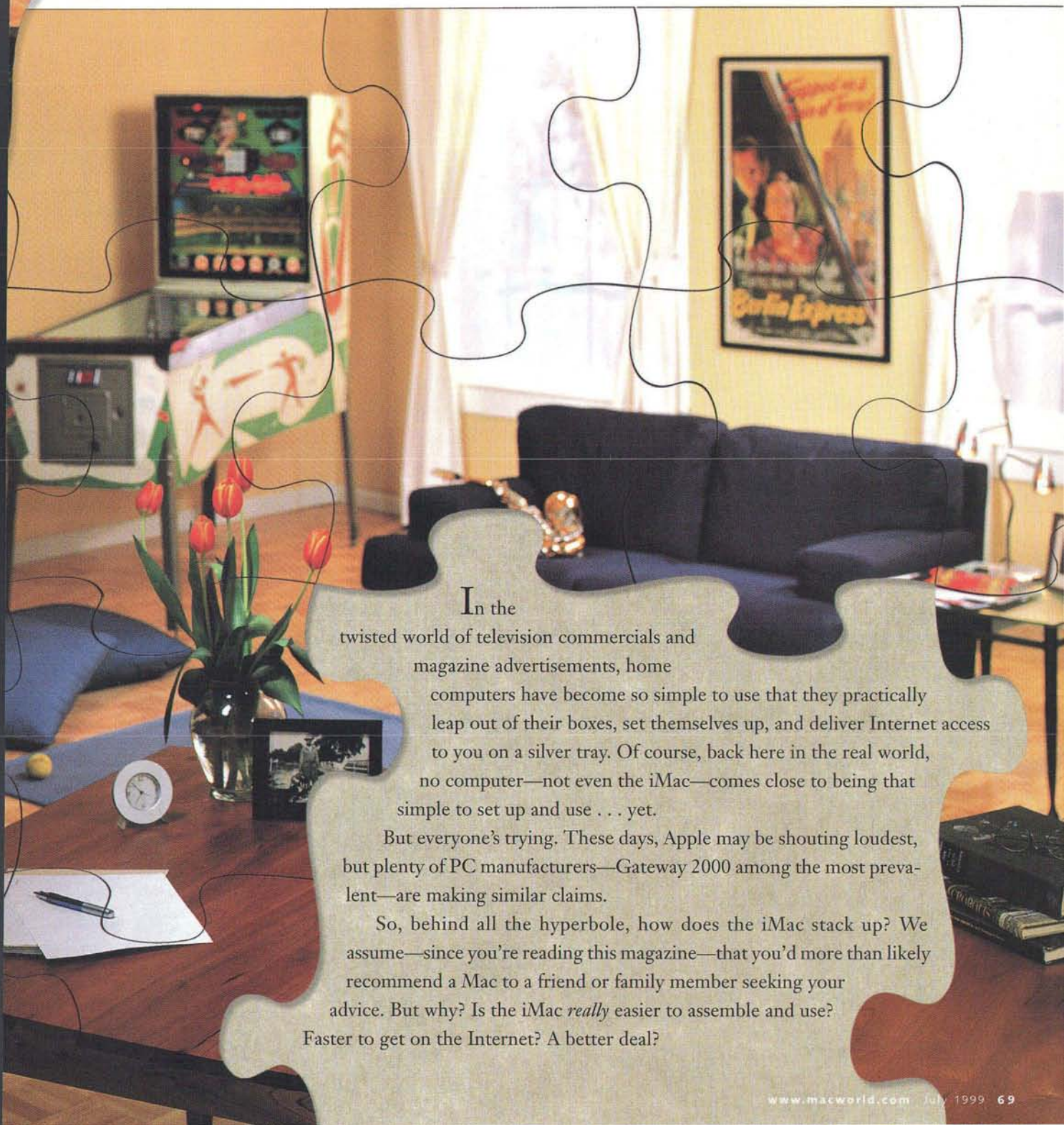
The iMac Challenge

BY CHRISTOPHER BREEN
AND MICHAEL PENWARDEN





WHICH IS EASIER TO USE, AN iMAC OR A CONSUMER PC? MACWORLD ENLISTED A GROUP OF NEW COMPUTER BUYERS TO PIECE TOGETHER THE ANSWER.



In the twisted world of television commercials and magazine advertisements, home computers have become so simple to use that they practically leap out of their boxes, set themselves up, and deliver Internet access to you on a silver tray. Of course, back here in the real world, no computer—not even the iMac—comes close to being that simple to set up and use . . . yet.

But everyone's trying. These days, Apple may be shouting loudest, but plenty of PC manufacturers—Gateway 2000 among the most prevalent—are making similar claims.

So, behind all the hyperbole, how does the iMac stack up? We assume—since you're reading this magazine—that you'd more than likely recommend a Mac to a friend or family member seeking your advice. But why? Is the iMac *really* easier to assemble and use? Faster to get on the Internet? A better deal?

SETUP

To answer these puzzling questions—and to better understand how easy it is to integrate a computer into the home—we purchased a new, $1,200 iMac and a similarly configured and priced Gateway 2000 Essential 366MHz C. (For the complete specifications of both systems, see the sidebar "All the Pieces.")

We invited nine people on the verge of purchasing a home computer to get these new machines up and running all by themselves (see the sidebar "Meet the Panel"). All of our participants unpacked the boxes; set up the iMac and PC; and performed such routine tasks as connecting to the Internet, launching programs, and adjusting the computers' controls. (For more details, see the sidebar "Computer Obstacle Course.")

Each panelist's success with both the PC and the iMac depended largely on the panelist's previous computer experience. But the most surprising findings were the unexpected but problematic oddities that more-experienced users take for granted and easily work around. Computer commands that Microsoft and Apple assume are intuitive are actually not very straightforward. For example, when we asked the panelists to go to the Mac's *Finder*, a few members started hunting around for the computer's *find* option. In the end, both Apple and Microsoft could stand to learn a little from the other, and both interfaces still have a long way to go before they're as easy to use as one would hope.

PHOTOGRAPHY BY KEVIN CANDLAND / PUZZLE-PIECE CONSTRUCTION BY STEPHEN SUGG

Ready, Set, Go

For seasoned computer buffs, assembling a computer is probably less difficult than programming the family VCR. And setting up a computer in Macworld Lab is an even easier task. Our state-of-the-art facility comes equipped with ample outlets, proper lighting, and plentiful cords and connectors. But chances are, your home doesn't have the same arrangements. So to create the most realistic experience for our testing, we designed a cozy home environment, complete with heavy living-room furniture and awkwardly placed wall outlets, at the Embassy Suites hotel in Burlingame, California. Before each person arrived, our lab analysts dutifully restored each computer to its original state, disassembling the components; rebagging the parts, documentation, and cables; and carefully putting all the items back in the boxes exactly as they were when the boxes were first opened. And with each new panelist, we

Meet the Panel

We gathered together nine individuals who were contemplating buying a new computer to use in their home. Our jurors were a diverse bunch—of all ages, backgrounds, and attitudes about computers. A few panelists use a computer in the office, while others have hardly touched a keyboard or a mouse. In the end, however, each person was interested in the same thing—getting connected at home. Chances are, these panelists probably sound like someone you know, or maybe they even fit your personal profile. Whether for budgeting the family finances, surfing the Web, telecommuting, or playing arcade games in the living room, everyone agreed that an easy-to-use computer is an essential addition to any home.

CAMERON AND JULIANNE
Our youngest participant, Cameron, is a 9-year-old aspiring baseball player who uses a Mac at school and a PC at home. His 28-year-old mother, Julianne, is also a student and home decorator who uses the home PC.

DAVID
David, a 29-year-old journalist who started with PCs in school and a 512K Mac at home, now uses a PC at work (running Windows 3.1) and recently purchased a new PowerBook for his home.

DOUG
Doug, 45, is a musician who employs both Macs and PCs for MIDI sequencing and sound editing.

ELIZA
Eliza, 26, works for a PC-equipped nonprofit organization but used a Power Mac in her previous job.

HOWARD AND JONELLE
Howard, a 56-year-old legal anthropologist, and Jonelle, a 55-year-old bookkeeper, have a Mac at home and PCs at work.

KEVIN
Kevin, a 37-year-old attorney, claims that besides word processing an occasional letter, he has virtually no computer experience.

LETHA
Our 33-year-old chiropractor, Letha, doesn't own a home computer and rarely uses the PC at work.

found that these so-called *easy* computers were more puzzling than the advertisements imply.

Getting Connected

No surprise here: the iMac, with its all-in-one design, took the least amount of time to set up. On average, our panelists took under six minutes to pull the iMac from the box; plug in the power cable, keyboard, mouse, and modem; and turn on the computer.

The Gateway 2000 PC, which comes as a bundle of three separate packages (the minitower, a monitor, and speakers), includes a wealth of color-coded cables and step-by-step instructions. Our panelists spent an average of over 20 minutes unpacking and setting up the PC, which isn't actually bad when you consider how long it used to take to set up any computer. And remember, this is a onetime headache—once the computer is set up, you won't have to hassle with any more cords, adapters, and the like.

Some of our panelists—especially those who first tested the iMac and then moved to the PC—were confounded by the sheer number of parts and cables they needed to hook together to assemble the PC.

"Good Lord! This is a nightmare," said David as he opened the box that also contained the PC's CD-ROMs and manuals. Upon seeing the three PC boxes, Doug—who also started with the iMac—said, "I'm already depressed . . . three boxes instead of one."

A couple of panelists attempted to turn on the PC before they'd made all the connections. Eliza failed to plug in the monitor. "I mixed all the cords up," she said when she realized her error. "There are too many of them."

First impressions of the iMac were far more positive. Jonelle declared the iMac "one cute little thing" and suggested that the all-in-one package was "all you'd want." And as soon as Letha pulled the iMac from the box, she exclaimed, "Oh, I like it already!"

ADVANTAGE: iMAC

Internet Connection

Even though the *i* in Apple's iMac stands for "Internet," we discovered that our panelists got online faster with Gateway 2000's PC. Thanks to Gateway.net, the company's own Internet service provider (whose account software is included on the computer's hard disk), our panelists simply clicked on the Internet icon to explore the World Wide Web. In less than 15 minutes, each panelist signed up for an account and got onto the Web.

In contrast, our panelists took over 24 minutes to get online with the iMac's default Internet service provider, EarthLink. The long-winded tour guide in the Internet Setup Assistant delayed getting online.

ADVANTAGE: PC

Some Assembly Required

The easy setup of the iMac made a big impression on our panelists. Almost all agreed that the iMac's quick assembly is great for new users. And although most of our panelists were initially daunted by the number of parts that came with the PC, everyone found the color-coded cables helpful and thought the flowchart instructions were coherent and easy to follow.

"I AM ALREADY DEPRESSED . . . THREE BOXES INSTEAD OF ONE," DOUG SAID AS HE BEGAN UNPACKING THE PC

In the end, the iMac's all-in-one design will spare you the confusion and hysteria of staring at a roomful of boxes, parts, and cables. On the other hand, the PC, with its colored cables, was no more difficult to assemble than an average home stereo system (or Apple's Power Mac G3, for that matter). Once you have the electronics set up in your house, you'll probably never have to think about assembly again.

ADVANTAGE: iMAC

All the Pieces

APPLE iMAC

Price (including shipping)	$1,199
Processor	266MHz G3
Memory (RAM)	32MB
Hard drive	6GB
CD-ROM drive	32×
Monitor	15-inch
Modem	56-Kbps

GATEWAY 2000 ESSENTIAL 366c

Price (including shipping)	$1,215
Processor	366MHz Intel Celeron
Memory (RAM)	32MB
Hard drive	8.4GB
CD-ROM drive	32×
Monitor	15-inch
Modem	56-Kbps

USAGE

We asked our panelists to use each computer's help and file-finding features to figure out how to change the volume; play an audio CD; launch a word-processing application; create a new folder; and create, save, and move a new document.

Getting Help

One of the Mac's advantages is that the desktop always looks the same regardless of who you bought your computer from. Unfortunately, that's not the case with some Windows-based computers. If you buy a computer from Dell, for example, the desktop may look different than that of a computer made by another manufacturer, such as Gateway 2000.

Our users bumped into this problem when they double-clicked on the Help icon on the Gateway's desktop. Instead of finding the information about Windows they expected, they stumbled upon tips for contacting Gateway 2000. Most panelists were stumped when they couldn't find the Windows-specific information they were seeking, and they asked us for pointers to find the actual Windows help system.

To the Mac's credit, the panelists immediately found and accessed the help feature from the iMac's menu bar or by pressing the help key on the keyboard. "I'm just amazed at how computers know how to do all this," admitted Letha. Since the Mac's Help menu is always visible on the Mac menu bar, it is much easier for new users to find their way through a sometimes daunting interface.

ADVANTAGE: iMAC

Playing Tunes

Both the Mac's and the PC's volume control can be accessed by double-clicking on the speaker icon on the Control Strip or menu bar, but since the symbols on icons weren't obvious to our new users, most found what they needed by using each computer's help feature. And many panelists said that they'd prefer to use the controls on the front of the external speakers instead of fussing with the software. Unfortunately, the iMac's self-contained case doesn't have external volume controls.

Opening the PC's CD-ROM drive and playing music was a snap for all our evaluators. But the iMac's ambiguous-looking drive was not as popular—neither

Computer Obstacle Course

Each of the nine panelists braved our computer obstacle course to evaluate Apple's iMac and Gateway's PC based on how easy it was to perform the following five tasks.

The panel was given a list of detailed instructions to test how simple it is to get started with these computers. Both a *Macworld* editor and a lab analyst observed and timed the panelists as they worked with each computer. After each completed task, the panelists rated their experience.

TASK 1: Plug it in.

Unpack the computer boxes, untangle the cords, consult the manufacturer's instructions (if necessary), and turn on the computer.

The iMac was up and running in less than six minutes, thanks to its all-in-one design. The PC's average setup time was just over 20 minutes.

Kevin nor Doug spotted the drive immediately. And all of our panelists were hesitant about pulling open the drive, since most were accustomed to a fully extended tray like you'd find on a PC or your home stereo. And listening to tunes on an iMac wasn't much fun for Howard and Jonelle, since they inadvertently turned off the computer in an effort to pop out the CD-ROM drive tray.

ADVANTAGE: PC

Working with Documents

Luckily it's not too difficult to create word-processing documents on either computer. If our participants could not locate Microsoft Word 97 on the PC or AppleWorks on the Mac, they dutifully used the Find command to track down the respective program.

Those jurors who had used either Windows or the Mac OS before instinctively went to the Start menu to launch Word 97 or dug through the iMac's hard drive to locate AppleWorks. And although our panelists found both applications in a short amount of time—approximately four minutes—most of them were delayed in Word 97 due to Microsoft's animated paper clip. Until they closed the talking-paper-clip window in the bottom right corner of the screen, they couldn't type in the document. Julianne expressed her frustration by repeatedly clicking on the talking paper clip, saying, "Go away! Go away! Go away!" while her son, Cameron, pleaded, "He's cool! I don't want him to go away!" Eliza was less charitable: "This guy drives me crazy. He's annoying."

JULIANNE VENTED HER FRUSTRATION BY REPEATEDLY CLICKING ON WORD 97'S TALKING PAPER CLIP, SAYING, "GO AWAY! GO AWAY! GO AWAY!"

Although everyone created a new folder fairly quickly on the Mac, many of the panelists struggled with this task on the PC. However, once we pointed out the right-click mouse feature on the PC, our panelists were awed by the handiness of the pop-up contextual menus with the New Folder option.

ADVANTAGE: iMAC

TASK 2: Hook it up.

Follow the computer's electronic instructions for registering for an Internet account and getting connected to the World Wide Web.

Thanks to Gateway's own Internet service provider, our panelists were online in about 15 minutes. With the iMac, our users took more time (an average of 25 minutes) to get e-mail accounts, since they listened to EarthLink's talking assistant.

VALUE

Now, some may say that comparing an iMac to a PC is like comparing an apple to an orange, but when it comes to hardware, both computers met the same requirements. Apple's iMac and Gateway 2000's PC both cost $1,200 and include comparable modems, monitors, and amounts of memory. And yet, of our nine panelists, five thought the low-cost PC was a better value.

Why? Because, as David remarked, "It feels like you're getting more stuff." Granted, this seems to be at odds with the feelings that "more stuff" made setting up the computer more difficult. However, our panelists cited reasons beyond the visceral for casting their value vote to the PC.

Room to Grow

Doug worried about the iMac's lack of expandability. The Gateway PC—with its three PCI slots—assured Doug that he can install new audio or video cards if he needs to. The iMac, with its closed-case design and lack of expansion slots, can never do that.

ADVANTAGE: PC

Compatibility

Regardless of how much you love the Mac, there's one pressing concern for people who work in a corporate environment: compatibility. Kevin, like others in the workforce, is concerned about bringing a Mac into his home since most offices are equipped with PCs. Even though there is an abundance of software programs that bridge the compatibility gap between Windows and the Mac OS, it's too much trouble for some users. Howard expressed concern with the iMac's missing floppy drive, since he would probably be transporting data from work to home.

ADVANTAGE: PC

Style

Love it or hate it, the iMac makes a bold, visual statement. Such cannot be said for the predictably beige PC from Gateway 2000. For some of our panelists, however, the iMac's design worked against it.

Because of its traditional design and packaging, the PC appeared to be more of a "real" computer than the iMac and therefore more valuable. Jonelle, who considers herself a "Mac person" surprised herself by saying that the iMac felt "more like a toy than a machine."

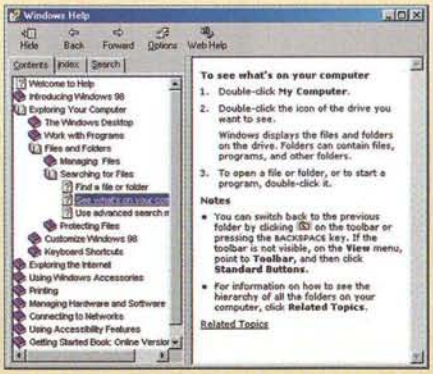
And while Cameron thought the iMac looked "cool," his mother, Julianne, was less impressed, saying that the iMac's look was "juvenile" and that she'd never consider placing one in an office. Because of its colorful two-tone appearance, Kevin thought of the iMac as a "computer lite," with the design emphasizing that it was "your first computer."

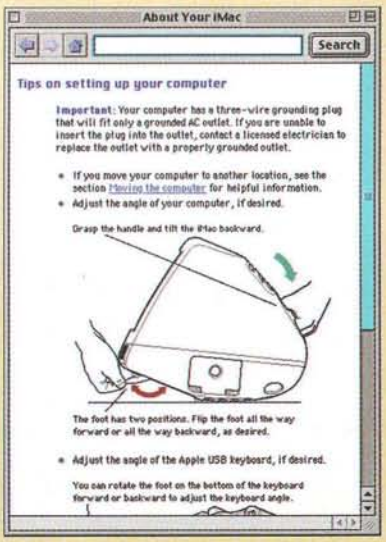
Letha admired the iMac's "simplicity," while David appreciated the iMac's compact size. He thought the iMac was a better value because "there's not much to

TASK 3: Get help.

Use the computer's help and find features to learn more about performing basic functions, locating applications, and customizing your desktop.

Our panelists found the answers in Apple's Help menu in about five minutes; it took them only about seven minutes on the PC.





screw around with." An apparently tidy soul, he also commented that the single-unit iMac would require less dusting than the PC and its components.

A D V A N T A G E : T I E

Beneath the Surface

In the end, however, less measurable phenomena are what really matter when judging the overall experience of using any computer. What was difficult about each, and why? Which one *felt* faster? Which has a better monitor and better sound?

Both Apple and Microsoft have emphasized how intuitive their respective operating systems are to use. Our panelists, on the other hand, felt that both interfaces have their unclear elements. We've already mentioned the confusion surrounding the Gateway 2000 help system and the difficulty of creating a new folder on the Windows desktop. But some panelists had problems with the Macintosh OS as well. Doug, for example, was unfamiliar with Mac OS 8.5 and scoured the Apple menu for the Find command, not realizing that it had been renamed Sherlock.

A D V A N T A G E : T I E

Need for Speed

Without knowing the megahertz rating of each computer, most of our panelists decided that the iMac *felt* faster to them. On paper, however, the iMac's 266MHz G3 processor is less impressive than the 366MHz Intel Celeron chip running inside the Gateway 2000. Since our participants ran only a few applications, most panelists judged the speed of the computers by the amount of time that elapsed between turning on the computer and accessing the desktop and on how responsive the computer was during normal tasks.

WHEN SURVEYING THE PC AND ITS COMPONENTS, DAVID REMARKED, "IT FEELS LIKE YOU'RE GETTING MORE STUFF"

Interestingly, our lab tests show that the iMac and Gateway PC take the same amount of time to launch the operating system. For more Macworld Lab test results, see the benchmark, "Does the iMac Stack Up?" And for speed results for the new 333MHz iMac, see *Reviews*, elsewhere in this issue.

A D V A N T A G E : T I E

The Big Screen

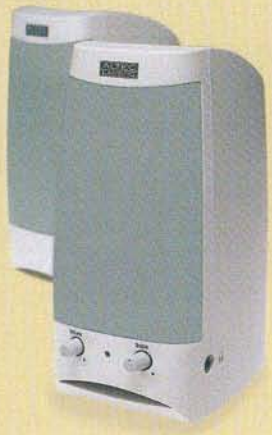
Looks can be deceiving: although the PC and iMac's monitors have the same viewable area, the screens appeared to be different sizes. Since the PC's monitor is a separate component, David, Howard, and Jonelle thought the PC's screen was larger than the iMac's. Letha and Doug thought the iMac's monitor looked better, whereas the other panelists reported no difference between the quality of the two displays.

A D V A N T A G E : T I E

TASK 4: Turn it up.

Locate each computer's sound controls. Adjust the volume by using the electronic control panel or the speaker knobs. Lastly, play an audio CD in the CD-ROM drive.

In our tests, our users adjusted the sound in about two minutes.



Now Hear This

As you'd expect, the PC's external Altec-Lansing speakers produce a much richer, fuller sound than the tiny speakers built into the iMac.

A D V A N T A G E : P C

Take Control

In the never-ending battle between the notorious rounded iMac mouse and the plain-vanilla traditional PC one, our panelists preferred the PC's input device, hands down. Kevin felt that the iMac's mouse was awkward—although he assumed "you'd get used to it"—and he further commented that the iMac's keyboard was a little small. Eliza nicely summed up her impressions of Apple's input devices while unpacking the iMac: "What a funky-looking mouse." After using the iMac mouse for a while, Eliza confirmed what she originally suspected: the mouse is too small, with an awkward shape, and it's too easy to lose track of which end is up. On the other hand, Letha, new to the entire world of computing, was simply enchanted by it all.

"WHAT A FUNKY-LOOKING MOUSE," ELIZA SAID WITH A PERPLEXED LOOK ON HER FACE

A D V A N T A G E : P C

Putting the Pieces Together

When it comes to finding the best computer for your home, you're the best judge. Our panel of first-time users provided insightful interpretations of their experiences working with both the iMac and a Gateway 2000 PC. To fill out the picture, Macworld Lab conducted performance tests, evaluated the bundled software, and took a gander at each company's tech-support and Internet-fee policies. Here's what we found.

Overall, the iMac is without question the easier computer to assemble, thanks to its all-in-one design and straightforward instructions. Although Gateway's PC was certainly cord-laden and although our panelists initially found this plethora of cables and components overwhelming, don't place undue importance on cables. Whether you have a PC or a new Power Mac G3, the minor annoyance of coping with cables is primarily an issue only when you first assemble a computer. Once the systems were set up, our panelists found Gateway's path onto the Internet slightly straighter than Apple's. Gateway's default Internet service provider, Gateway.net, is free for the first year on computers costing $1,299 and more (our 366MHz test system fell short of this mark by $100). Even though the small print points out that you have to pay $75 for the software to set up your Gateway.net account, you still pay less in a year than you do to use Apple's default ISP, EarthLink, which is free for the first month and $19.95 per month thereafter for unlimited access, with a wealth of toll-free phone numbers. With reduced rates for six-month plans, you can find even better deals.

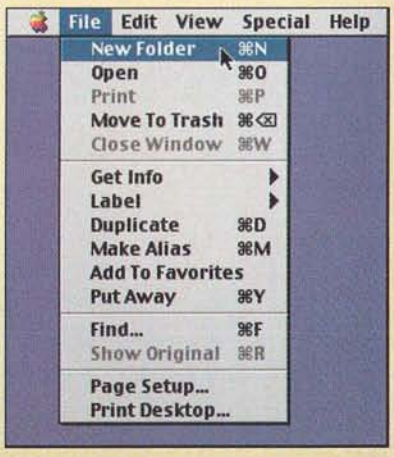
In addition to recording the independent observations of the panelists, Macworld Lab compared the experience of using each system on a daily basis. Superficially, Windows and the Mac OS provide essentially the same level of intuitiveness and power. However, Windows' roots as a DOS shell are still too easily exposed. Start mucking about within Windows and you'll quickly get entangled in confusing code.

Today's Mac OS, on the other hand, is part of the ongoing evolution of this intuitive operating system—

TASK 5: Write it up.

Locate the word-processing application, create a new document, and save the document to a newly created folder on the desktop.

Our panelists found AppleWorks and created a document, clocking in at about seven minutes each. The same task using Microsoft Word 97 on the PC took our panelists less than 12 minutes on average.



it effectively insulates you from encountering any arcane programming. Sure, troubleshooting any computer can be frustrating, but more often than not, solving a problem on a Windows-based computer will trap you in the inner workings of the operating system.

When it comes to technical support, Gateway 2000 offers the better deal: one year of free support for hardware, and 90 days of technical support for all bundled software, including Windows 98. After the free periods have expired, you can choose to call one of two lines—one that charges $25 per incident or one that charges $1.95 per minute. Both services are available day or night, any day of the week.

Unfortunately, Apple's technical-support services are less flexible. Although Apple successfully includes several help tutorials on the iMac's desktop, Apple gives you free support for only 90 days, and non-Apple software isn't covered. After 90 days, you can choose from three support options: $35 per incident, a 3-incident option for $69, or a 15-incident option for $340. Apple's iMac technical support line is available 12 hours a day, 7 days a week, Central time.

The Last Word

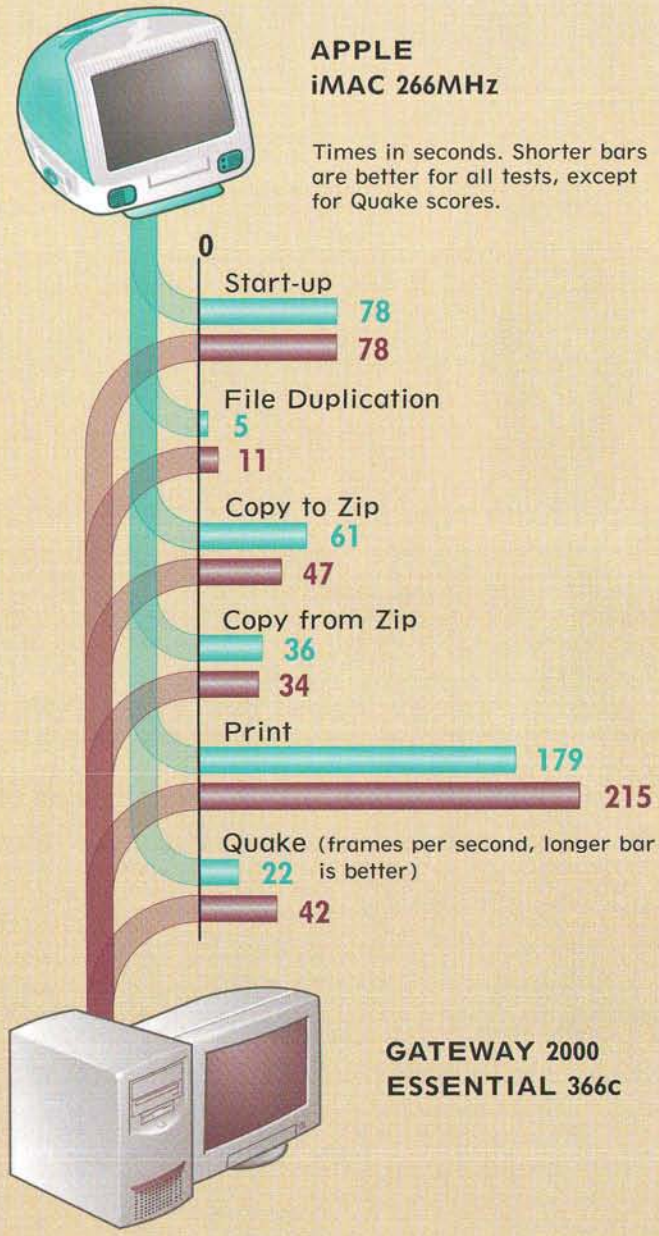
So in the end, how did the iMac fare? After it trounced the PC on setup, the rest of our tests left the two on fairly even ground. Neither computer's faults can be considered deal breakers, and neither computer dominates in any critical area. Our panelists thought the PC edged out the iMac in the Internet hookup department, but in reality, getting connected on either machine is an acceptably straightforward affair and something you have to do only once.

The panelists also gave the PC the vote for expandability. Fair enough, but keep in mind that most home users won't want to crack open the case once their computer makes it into the living room. Instead, they'll opt to use USB ports when it's time to add a peripheral such as a Zip drive. And compatibility? Since most major applications are compatible across platforms, opening files on either machine is generally no big deal. At the end of the day, then, they're both solid, capable home computers.

But we can't complete this comparison without considering one thing that won't show up on any spec sheet or price list: the overall elegance of each computer. We looked for the same type of deep care and craftsmanship you sense when driving a Porsche or operating a Bang & Olufsen stereo—their technological capabilities have been refined to the point where they transcend the sum of their parts to become something greater. In the end, that same passionate attention to detail exists in any Macintosh, including the affordable iMac. And that, more than its distinctive design or omnipresent ad campaign, is what ultimately makes the iMac stand out. m

Contributing Editor CHRISTOPHER BREEN pens *Macworld*'s monthly *Game Room* column and is a co-author of a forthcoming book about the iMac. Editor MICHAEL PENWARDEN has evaluated hundreds of PCs and Macs during his career.

Does the iMac Stack Up?



ARNE HURTY

BEHIND OUR TESTS

For the file-duplication and Zip copy tests, we used a 25MB Adobe Photoshop file. In our print test, we printed a ten-page text document to an Epson Stylus Color 740; we used each system's bundled word-processing application (AppleWorks for the iMac; Microsoft Word 97 for the Gateway 2000 Essential) and connected the printer via USB (Universal Serial Bus). Frame rates were recorded with id Software's Quake using hardware acceleration.

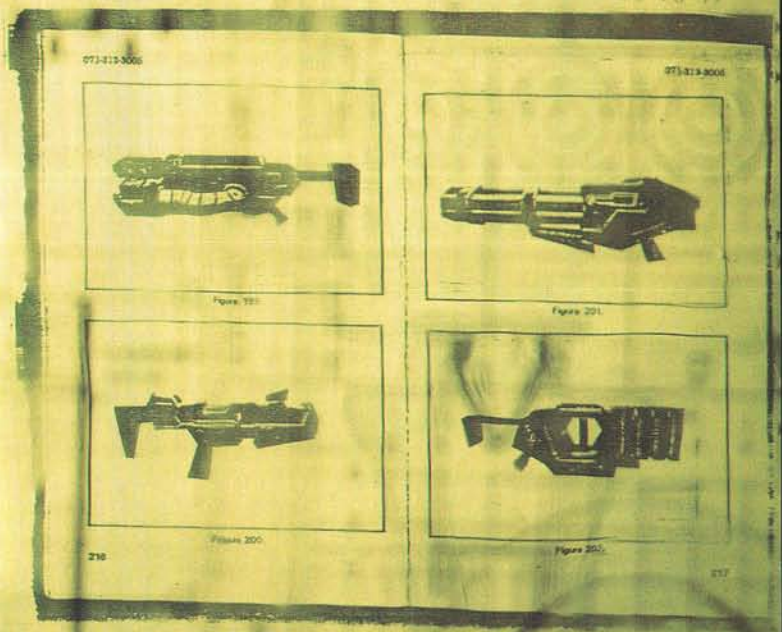
—MACWORLD LAB TESTING SUPERVISED BY GIL LOYOLA

19:42 You learn the hard way in the outer sectors... Like never get into a drinking match with a three-headed Bukan. Never assume a Strogg is dead even when he's nothing but bloody scraps of shrapnel. And never go to bed with a Rabaul no matter how many breasts she has.

19:11

THE LINE BETWEEN MAN AND MACHINE SHOULD NEVER HAVE BEEN ERASED.

Blood vessels and wires should never have been crossed. Souls and circuitry, brain stems and processors.



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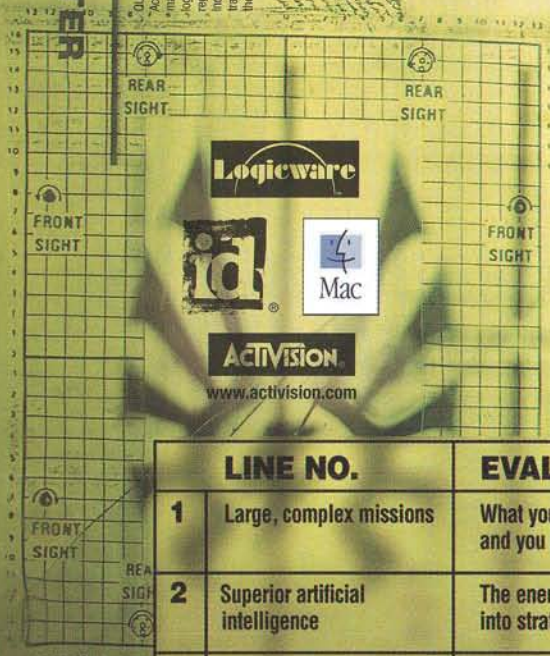

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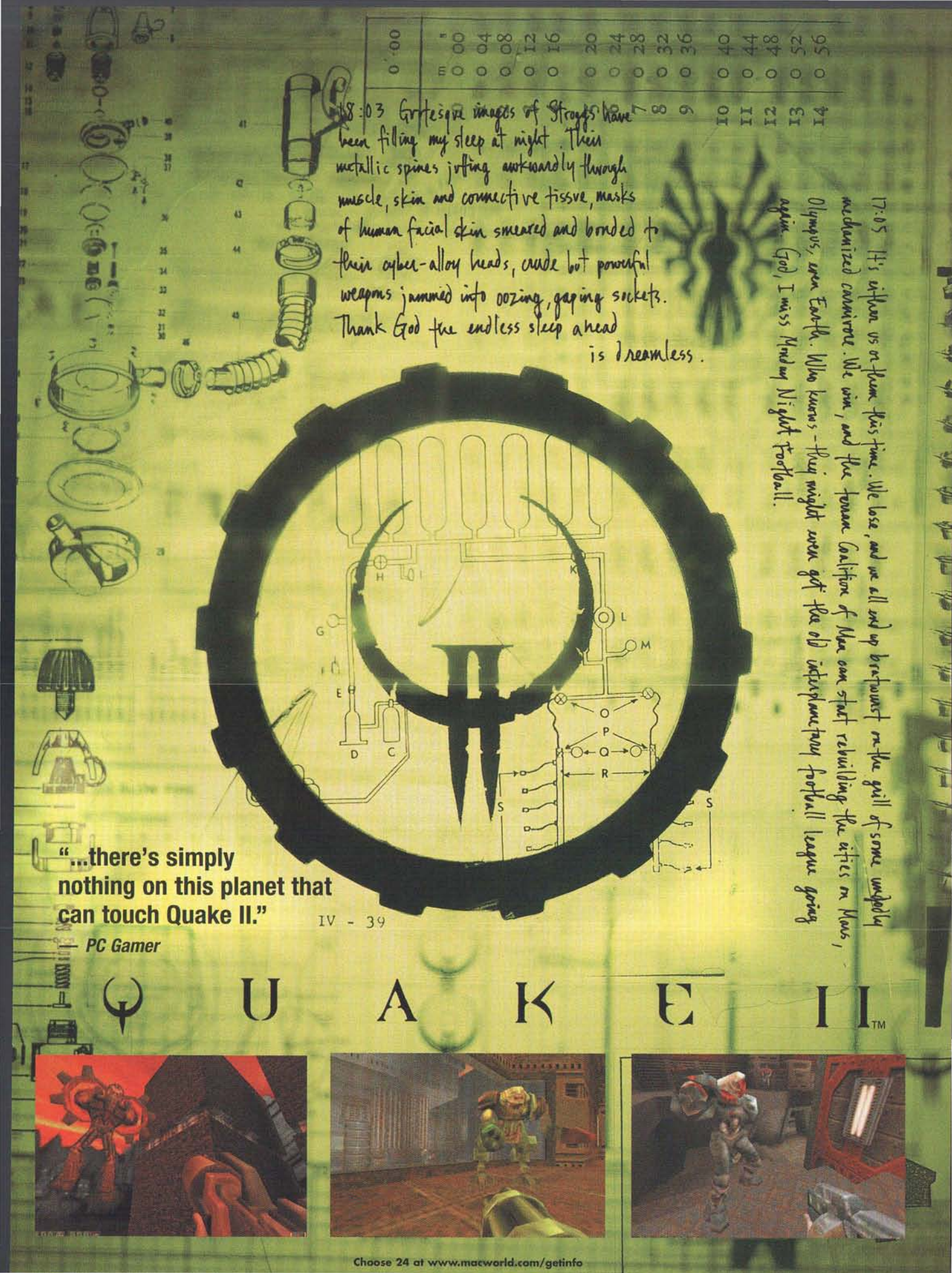
18:03 Grotesque images of Strogg have been filling my sleep at night. Their metallic spines jutting awkwardly through muscle, skin and connective tissue, masks of human facial skin smeared and bonded to their cyber-alloy heads, crude but powerful weapons jammed into oozing, gaping sockets. Thank God the endless sleep ahead is dreamless.
17:05 It's either us or them this time. We lose, and we all end up bretwurst in the grill of some unholy mechanized carnivore. We win, and the human Coalition of Man can start rebuilding the cities on Mars, Olympus, even Earth. Who knows - they might even get the old interplanetary football league going again. God, I miss Monday Night Football.
"...there's simply nothing on this planet that can touch Quake II."
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You Can Take It with You

3Com's New Connectivity Software Puts the Power of the Mac in Your Palm

BY DAVID POGUE

There was a time when we would have drooled at the thought of carrying our address books and calendars on a sleek, 3-by-5-inch gadget like 3Com's Palm handheld organizers. We would have thought a handheld Mac satellite that ran for two months on a pair of AAA batteries was cool.

But despite all the catchy features added to the new Palm IIIx (♦♦♦♦½; $369) and Palm V (♦♦♦♦; $449; *Reviews*, June 1999), this whole address book–calendar thing just doesn't make jaws drop anymore. The much bigger news is 3Com's

release of its long-delayed but excellent MacPac software kit (see "Mac's Best Friend," August 1998), available free from http://palm.3com.com/macintosh.

As of right now, the Palm organizer is no longer an expensive electronic address book for the stylish Mac user. Thanks to an ingenious array of new Mac programs, that little handheld device can now be a seamless extension of your Mac. Want to put Microsoft Office, FileMaker Pro, Quicken, or Eudora in the palm of your hand? Let us show you the way.

Photography by Mark Johann

MacPac Magic

The new MacPac software (♦♦♦½; *Reviews*, June 1999) comes in two parts. One is Palm Desktop, a made-over version of the address book–calendar program once known as Claris Organizer. Far more important is the component most Mac fans don't know anything about: the behind-the-scenes software known as Conduit Manager.

Conduits are plug-ins from other software companies that create hookups between the Palm and various popular Mac programs. Thanks to this technology, the Palm can exchange data with your Mac applications, as long as someone has written an appropriate plug-in and you've placed that plug-in in the Conduits folder.

Now that the new MacPac has arrived, a flood of new conduits has also arrived. Here's a look at the first crop of Mac-Palm third-party conduits. With these doodads installed, you can put your Palm organizer in the included cradle, press a single button, and watch as the palmtop synchronizes data—HotSyncs—with all kinds of friendly Mac programs. Be warned: some of them are good enough to make you rethink the way you do your work.

Spreadsheets to Go Documents To Go's Palm-based spreadsheet lets you split the display and even freeze rows or columns.

Business to Go

At first you might consider it ludicrous to work with your business productivity data (in a Microsoft Excel spreadsheet, for example) on a handheld computer. Be surprised—very surprised.

Microsoft Office It's no surprise that DataViz came up with Documents To Go 1.0 (♦♦♦½; $40), a handy converter. The company has been in the Mac file-conversion business for years. When you drag your Microsoft Word or Excel documents into the Documents To Go window, they effortlessly convert into Palm-readable format and load onto your palmtop at the next HotSync. The entire process requires only a single mouse drag—or less, if you use the contextual control-click menu to select any Word or Excel file in the Finder. Better yet, if you edit the original document later, the Documents To Go conduit is smart enough to notice—and to send the revised version automatically to the Palm at the next HotSync.

On your Palm, you read these text and spreadsheet documents using WordView and SheetView, tiny Palm programs designed for the purpose. These programs are thoughtfully designed—SheetView is the only Palm spreadsheet application, for example, that lets you split the spreadsheet into individually scrolling panes (see "Spreadsheets to Go").

The big Documents To Go bummer is that you can't edit the translated documents; in version 1.0, your documents are read-only. And it's a shame that WordView can't display bold or italics—a feature that's available in other Palm text readers. (DataViz says it's working on both issues.) Still, the software does what it does remarkably smoothly, and even just the ability to read your Office documents while you're in transit is a useful new way to multitask.

Putting the New MacPac to Work

If you're a Palm user, Palm's MacPac software is destined to become an integral part of your life. To save time and hassle, it's worth getting to know these undocumented shortcuts.

Calendar Keys Palm Desktop's calendar, like the Palm's, offers three views—Daily, Weekly, and Monthly. You can quickly switch among the views via the keyboard shortcuts ⌘-shift-D, -W, and -M, respectively. Or repeatedly click on the View Calendar icon on the tool bar to jump from view to view.

To jump to the previous or next day, week, or month, press ⌘–left arrow or ⌘–right arrow instead—and if you throw in the option key as well, you jump a week at a time in Daily or Weekly views. In Monthly view, if you double-click on a calendar square, a dialog box appears, asking if you're creating a Task, Appointment, or Event Banner. Double-click on the option you want—or just type the first letter and press return.

Address-Book Smarts If you're entering names and addresses into Palm Desktop directly, don't bother pressing the shift key—Palm Desktop capitalizes the first letter of each name automatically. Nor do you have to format your phone number with parentheses and hyphens. By choosing Preferences from the Edit menu, you can select an automatic formatting option for your phone numbers and then type them all without any punctuation.

Another caution: resist the temptation to use the Email label in the first block of four phone numbers in Palm Desktop. Instead, enter each e-mail address in the Email field at the bottom of the Contact window (in the Other Information area). Only this field is HotSynced to the corresponding Palm address-book e-mail field. Finally, use the Comments field to store miscellaneous notes instead of attaching a Note; by doing so, you avoid having to face the Note Conundrum.

The Note Conundrum On the Palm, you can attach a Note to an appointment, to-do item, or address-book entry. In Palm Desktop, however, this note-attaching feature doesn't work the same way.

Adding notes on your Palm device works beautifully. When you HotSync, such notes transfer to Palm Desktop as attachments to the correct items, exactly as on the Palm.

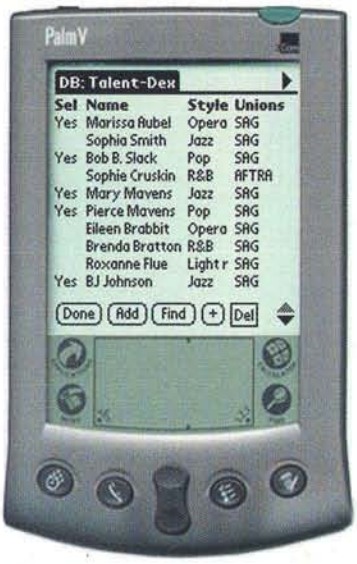
The problem arises when you want to attach notes *in Palm Desktop*. They don't appear as attached notes on your Palm unless you take a peculiar step. You must name such a note using one of these special titles—Handheld Note: To Do Item, Handheld Note: Address Book, or Handheld Note: Date Book (depending on the kind of item to which you're attaching the note).

After creating your note in this way, *then* you can attach it to a calendar, address book, or to-do item (by dragging its handle onto the target item)—and it indeed HotSyncs to the Palm as a note attachment.

Multiple Personalities If you HotSync two (or even

FileMaker Pro His day job is writing software for Apple; good thing Rob Tsuk had time to write FMSync (♦♦♦♦½; $38). This conduit synchronizes a FileMaker Pro database with Land-J Technologies' JFile ($20 shareware; www.land-j.com), the most popular Palm database program (see "FileMaker Gets Small").

FMSync's intelligence is astounding; before the HotSync, you tell it which FileMaker databases, and even which *layouts* in those databases, you'd like translated to the Palm. (Even if your FileMaker database contains 300 fields, JFile can handle only 20. Therefore it's usually best to create a FileMaker layout—with 20 fields or less—exclusively for FMSync.) At the next HotSync, FMSync builds a matching database on your Palm, complete with named fields of the correct type and in the correct order. From now on, after a HotSync your FileMaker database will reflect any changes you make on the Palm, and vice versa.



FileMaker Gets Small The FMSync conduit creates and maintains mirror copies of your Mac-based FileMaker database (right).

As though that weren't enough power, you can even specify FileMaker scripts to run before and after the HotSync process. (You could ferret out clients in zip code 10024 who owe you money, for example.) A check box lets you control whether Jfile should receive the entire database or only the records in the currently found set.

Eudora, Outlook, and More Windows users enjoy the ability to read and reply to e-mail on the Palm—even without getting a modem for it. At each HotSync, unread messages from their Windows e-mail program appear in the Palm's built-in Mail program. Macintosh fans have been gnashing their teeth for years, unable to use Palm Mail.

That wait is over, thanks to Actual Software's simple, cleverly designed MultiMail Conduit 1.1 (♦♦♦½; $30). Each time you HotSync, your e-mail from Qualcomm's Eudora or Eudora Light or (with version 1.2) Microsoft's Outlook Express—either unread mail or messages a specified number of days old—transfers to Palm Mail. If you prefer, you can HotSync your e-mail into the more powerful MultiMail Palm program itself ($60 bundled with the Mac conduit), which can also retrieve your e-mail directly from the Net if you buy a Palm modem. Either way, if you write replies on the palmtop, they transfer back to your Mac e-mail program at the next HotSync. (Support for Claris Emailer is coming soon.)

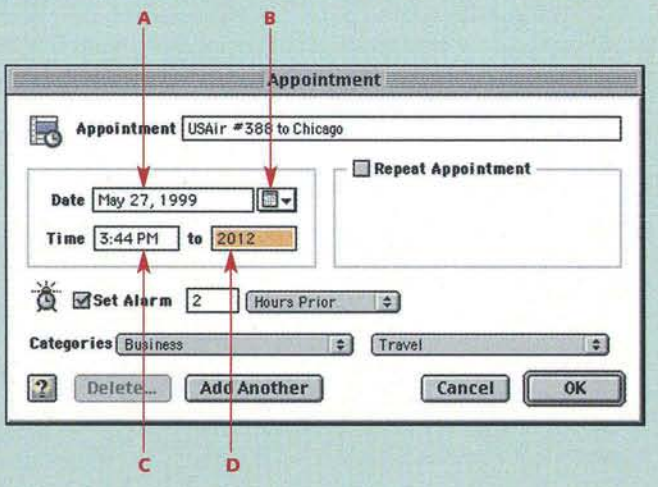
Money Matters

3Com calls its best-selling baby an organizer, but make no mistake: it's a real computer. (It even runs a Motorola 68000-family more) Palm devices to the same Mac, you can make it easy to switch among different Palm Desktop data sets.

Open the folder in which Palm Desktop is installed, open the Users folder, open the folder with the first Palm device's name, and make an alias of the User Data file. Rename that alias—for example, "Dave's Palm IIIx"—and stash it in your Apple menu. Repeat the process with the User Data file from your other Palm device, this time calling the alias, say, "Jennifer's Palm V." From now on, you can switch Palm Desktop files by choosing the appropriate name from your Apple menu, cutting many steps out of the usual procedure.

MacPac Extras In addition to Palm Desktop, the new MacPac includes an assortment of clever add-ons. (If you downloaded the MacPac from the Palm Web site, be sure to download the Palm Extras component as well.) The Faster HotSync software, for example, doubles the speed of HotSyncing to a Mac (to 112 Kbps instead of the usual 56). But don't install this amazing utility if you HotSync the same Palm to Windows and the Mac OS.

And if you're the proud owner of a late-model PowerBook or a Bondi blue iMac, you can actually HotSync by just pointing your infrared-equipped Palm at your computer's infrared jack—no cradle needed. This kit consists of four files you drag onto your Mac's System Folder icon, plus four files you install onto your Palm (their names end with the usual .prc suffix).



Quicker Time To save time, use some of Palm Desktop's undocumented keystrokes. Change the date (**A**) by pressing plus (+) or hyphen (–), or click here (**B**) to choose the date from a pop-up calendar. Specify time (**C**) by typing the minimum keystrokes necessary—*8a* suffices for 8 a.m., and *135* indicates 1:35 p.m. Press plus and hyphen to set the hour, and shift-plus and shift-hyphen to adjust the minutes. Or just use a 24-hour clock (**D**); if you type *2115*, Palm Desktop records 9:15 p.m.

ily processor, just like Macs of old.) As such, it's perfect for crunching your financial numbers.

Quicken You probably conduct most of your financial transactions, such as cash-machine visits and writing checks, when you're away from your desk. The Palm screams for a program that could record this information as you make your transactions and then dump this data automatically into Intuit's Quicken when you return home.

Enter LandWare's $40 Pocket Quicken. It's a nearly full-fledged Quicken clone, complete with transaction splits, memorized transactions, autofill, password protection, categories and classes, and a Quicken-like transaction register (see "Shrunken Quicken").

At the first HotSync, the Pocket Quicken conduit sends your Quicken file's list of accounts, balances, and categories to the palmtop. You go about your business, recording transactions as they occur, enjoying how Pocket Quicken reduces writing to the bare minimum.

Finally, you return to your desk. You press your HotSync-cradle button and watch in amazement as Quicken 98 launches by itself and, before your eyes, starts generating register transactions that reflect what you recorded on the Palm. The process is smooth as silk, even in the beta version we tested.

Major note: this data transfer is one-way. Your desktop never sends the transaction data to the Palm. Pocket Quicken is a sophisticated electronic scratch pad for recording transactions that you pour into your desktop computer.

Expense Reports Another built-in Palm program long useless to Mac users is the Expense application, which lets you jot down travel and business expenses as they occur. On Windows, when you return home, Expense totals, categorizes, and neatly lays out all these expenses in a ready-to-print Excel spreadsheet.

Shana comes to the rescue with Expense Creator (🖱🖱🖱½), a free program included with the new MacPac. (To get it, download the Palm Extras file from www.palm.com or get Expense Creator directly from Shana at www.shana.com.) It works exactly the same way—except that it doesn't require you to buy Microsoft Excel in order to print out your expense reports. This free program is actually a full-fledged database application that retains all your expense reports, which you can search, summarize, and organize. Its breadth of preference settings is impressive, especially for a freebie: you can input your reimbursement rate for mileage, foreign-currency exchange rates, a date range for items you want to appear on the report, and so on.

Shana's Expense Creator Advanced (🖱🖱🖱½; $30) offers even more features and a wider selection of report templates. It's better suited to hard-core corporate types, since it lets you add your logo, calculate sales tax, create custom fields, and more.

Intelligent Expenses Mac users can now use the Expense program built into the Palm—too bad it's so bare bones. Among other limitations, it lets you tag each expense with one of 28 categories (Dinner, Taxi, and so on)—but if you want to record an expenditure that's not on the list of 28 types, you're out of luck.

If expense reports are part of your life, you'd be much happier with WalletWare's Expense Plus (🖱🖱🖱🖱½; $70). Thanks to its unusual level of intelligence and logic, recording an expense as complex as "Taxi to the restaurant today, paid in cash, $5, to meet with Bob Smithers" takes only four taps. The large icons for specifying such data aren't just easy targets—they're in shades of gray, making Expense Plus the first commercial program to take advantage of the Palm's gray-scale screen features. You can even enter dollar amounts by pressing the Palm's scroll buttons, making it easy to record an expense on the run without the stylus.

When you return home, a HotSync transfers all of your data into your choice of Mac expense-report–generating

Palm-to-Mac Conduits Arrive

Company	Product	Mouse Rating	Price	Contact	Syncs Palm Application . . .	. . . to Mac Application
Actual Software	MultiMail Conduit 1.1	🖱🖱🖱½	$30[A]	978/475-2690 www.actualsoft.com	MultiMail[A], Palm Mail	Eudora, Eudora Light, Outlook Express, Claris Emailer[B]
Aportis Technologies	BrainForest Professional	🖱🖱🖱🖱	$40	custcare@aportis.com www.aportis.com	BrainForest	BrainForest
Chronos	Consultant 2.5.6 with Conduit 1.10	🖱🖱🖱½	$50	801/957-1774 www.chronosnet.com	Palm calendar, addresses, to-dos, memos	Consultant
DataViz	Documents To Go 1.0	🖱🖱🖱½	$40	800/733-0030 www.dataviz.com	WordView and SheetView (included), other doc-format readers	Word, Excel, text editors
FMSync Software	FMSync	🖱🖱🖱🖱½	$38	sales@fmsync.com www.fmsync.com	JFile	FileMaker Pro
LandWare	Pocket Quicken	NA[C]	$40	800/526-3977 www.landware.com	Pocket Quicken	Quicken 98
Shana	Expense Creator	🖱🖱🖱½	free	780/433-3690 www.shana.com	Palm Expense	Informed Expense Creator
	Expense Creator Advanced	🖱🖱🖱½	$30	780/433-3690 www.shana.com	Palm Expense	Informed Expense Creator
TeamSoft	TeamAgenda 3.1	NA[C]	$130	514/875-2231 www.teamsoft.com	Palm calendar, addresses, to-dos, memos	TeamAgenda
WalletWare	Expense Plus	🖱🖱🖱🖱½	$70	800/640-2068 www.walletware.com	Expense Plus	Excel, FileMaker, Informed Filler

[A] $60 for MultiMail Palm application support. [B] Emailer conduit in testing at press time. [C] Not applicable; product was not shipping at press time.

software: Excel, FileMaker, Expense Creator, or any AppleScript-savvy program you care to script. However, it's important to note this program's size: 326K, absolutely massive by Palm standards.

Organizing Done Better

Palm Desktop is an important part of the MacPac; for the first time, it offers a better-than-decent address book–calendar for Mac fans (and it's free). But that doesn't mean there's no room for improvement: the Palm Desktop calendar isn't networkable, for example.

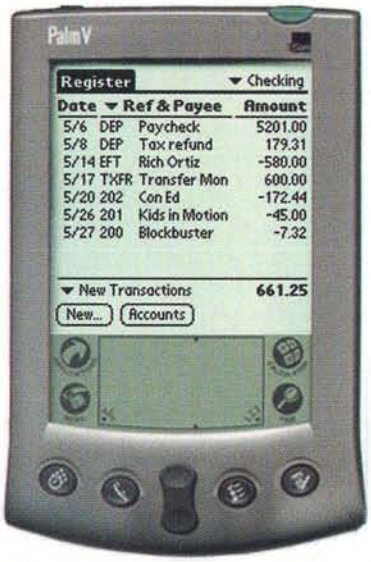
Eudora AWOL It's been two years since Qualcomm bought Now Up-to-Date and Contact and promised to merge the two programs into a single, updated app with Palm connectivity. But at press time, Qualcomm refused to promise to ever ship the new Eudora Planner, with or without Palm connectivity.

Chronos Consultant But that's OK, because a newcomer has filled the void—Chronos's calendar, address-book, to-do, and memo program, Consultant 2.5.6 with Conduit 1.10 (♦♦♦½; $50; *Reviews*, April 1999). This potent, full-fledged program is an organizer along the lines of Palm Desktop itself—but offers a prodigious list of extra features, such as a built-in journal, speech, a customizable button bar, Gantt charts, networkability, and copious preference options. And unlike Palm Desktop, Consultant lets you attach notes to your appointments and other records without creating any weirdness (see "Putting the New MacPac to Work").

As disappointed corporate users have discovered, Consultant's networking feature is its weakest link. It relies on file sharing, not a server like the defunct Now Up-to-Date, and you can send only private appointments to the Palm; public events get stranded on your Mac. If hard-core networking isn't your thing, though, you'll appreciate the cool looks, modern feel, and English-translation features of Consultant.

TeamAgenda For Mac fans pining for the server-based convenience of shared group calendars à la Now Up-to-Date, the solution is at hand. TeamSoft's TeamAgenda 3.1, in beta testing as this story went to press, seems to have it all. It's fast, stable, small, cross-platform, mind-bogglingly flexible, and inexpensive ($130 per seat for four users, with the per-user price decreasing as you buy more copies). You can scale the time "slices" in TeamAgenda's Day View from 5 minutes to 2 hours, specify fonts for everything, and even compare multiple agendas side by side. The program syncs with FileMaker, offers an optional Web interface, and is as simple to use as you could expect a group scheduler to be.

The included, free Palm conduit lets you specify what range of dates you'd like HotSynced and uses logical rules to govern how TeamAgenda's various appointment types transfer.



Shrunken Quicken If you use Quicken, you'll feel right at home with the Pocket version on your palmtop. The program even autocompletes transactions for you, exactly as on the Mac.

BrainForest Professional Aportis Technologies' BrainForest is the commercial incarnation of the popular Palm shareware program Outliner. The program is like a cross between an outliner and a project scheduler—it lets you add check boxes or due dates to each item in the outline.

BrainForest Professional (♦♦♦♦; $40; *Reviews*, June 1999) includes a smooth, solid Macintosh version of the program, with files the Palm version can read. BrainForest is not, however, a true conduit—it can't intelligently resolve simultaneous changes made to the Mac and Palm versions of your outlines. Instead, it's up to you to keep track of where the current version of your complete file exists—on the Palm or on the Mac.

Coming Soon The floodgates have opened. Among the Mac programs soon to HotSync with the Palm: On Technology's (www.on.com) Meeting Maker, a corporate scheduling and calendar program; CS&T's (www.cst.ca) Corporate Time enterprisewide, cross-platform calendar, scheduling, and e-mail program; Century Software's (www.centsoft.com) ClockWork Day Planner personal calendar and to-do manager; and, we suspect, many more.

The Last Word

In attempting to track the popularity of the Palm among Mac fans, Palm Computing once tallied the sales of the MacPac. Today, however, Mac fans don't actually need to buy the MacPac. They can download the free software and buy the necessary cradle adapter for $6 from Palm Computing (or, since it's a standard serial-port adapter, from an electronics shop).

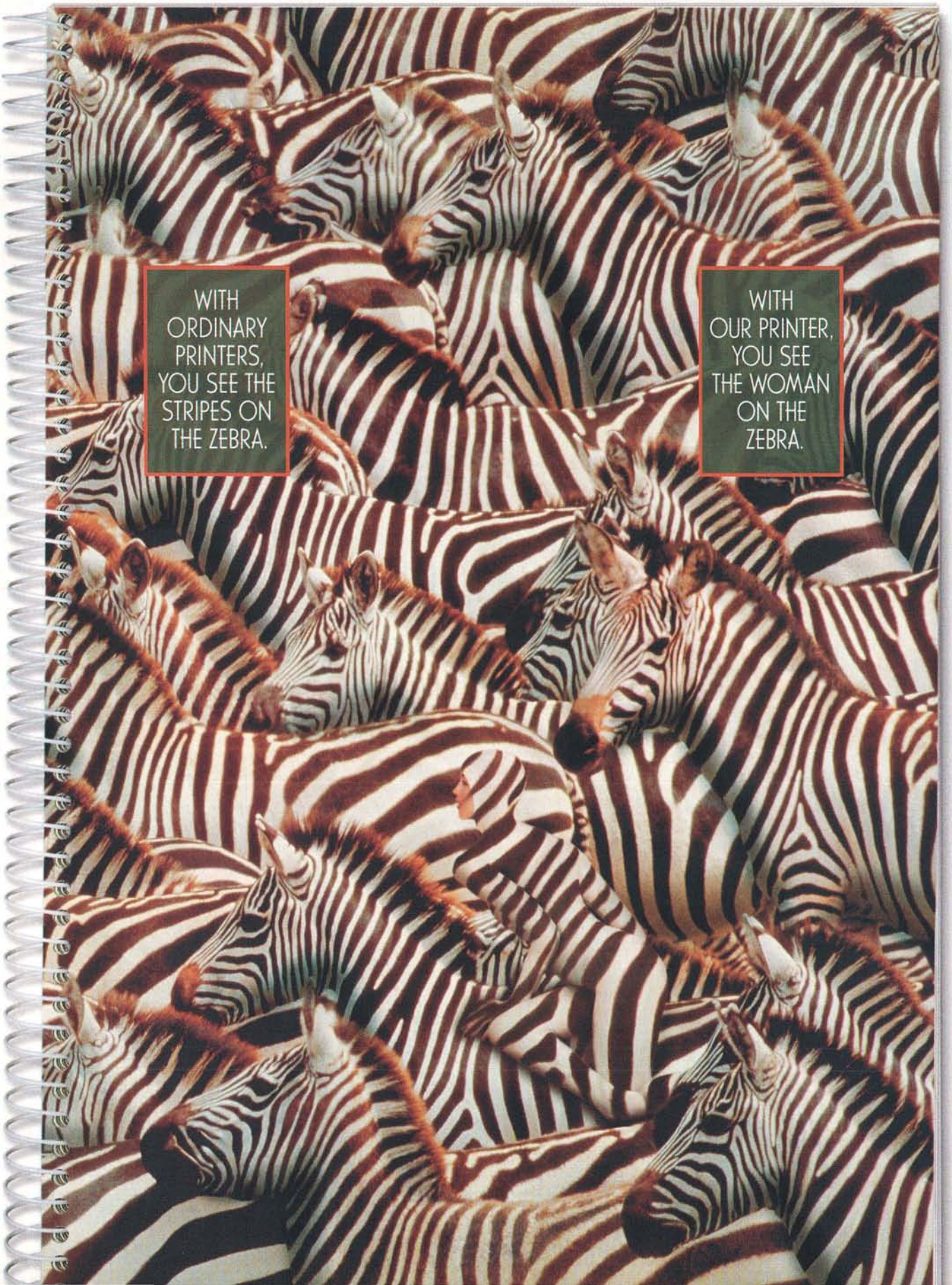
Therefore, Palm now gauges Mac interest by watching subscription requests for InSync Online, the company's free e-mail tricks-and-tips newsletter. You can sign up for it at www.palm.com (specify that you're interested in Mac information).

More important, the company closely monitors the registration cards for newly purchased Palm devices. (You won't wind up on junk-mail lists if you check the "I prefer not to receive mailings" box.) It's worth mailing that card (with the Macintosh check box selected) to ensure that 3Com hears from the Macintosh crowd. After all, now more than ever, the world's most elegant palmtop and the world's most elegant desktop computer are a match made in heaven. **m**

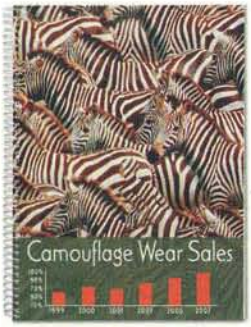
Contributing Editor DAVID POGUE (www.davidpogue.com) is the author of *PalmPilot: The Ultimate Guide*, second edition (O'Reilly, 1999).

Comments

Process your Mac e-mail on the Palm, no Palm modem needed.
Outliner, project tracker, and to-do list, on both Palm and Mac.
A richly featured—and networkable—alternative to Palm Desktop.
Drag-and-drop skills are all that's required to get your Office docs to the palmtop.
Smart, two-way, record-by-record syncing between FileMaker and JFile.
Miniature Quicken clone with one-way transaction dumping into Quicken 98.
Generates simple expense reports from the Palm's built-in Expense program.
Generates fancy expense reports from the Palm's built-in Expense program.
Intelligently grabs your schedule and contacts from TeamAgenda, a cross-platform group scheduler.
Clever, sharp-looking expense tracker. Makes the built-in Expense app look like SimpleText.


WITH ORDINARY PRINTERS, YOU SEE THE STRIPES ON THE ZEBRA.
WITH OUR PRINTER, YOU SEE THE WOMAN ON THE ZEBRA.

YOU'VE GOT TO SEE IT IN **EPSON** COLOR.



Can you spot the hidden rider among all these zebras? As you may know, it's our 1440 dpi that reveals her every detail. So when the company that made the amazing camouflage gear she's wearing had to create a sales report – and had to do it quickly – the printer they selected was the new EPSON Stylus® Color 900. Aside from capturing the incredible resolution you see here, it also prints sharp text at up to 12 PPM and color up to twice as fast as competitors at comparable dpi. That's the kind of performance that sets this printer way ahead of the herd. Which, in business, is exactly where you want to be.

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Only Epson® color ink jet printers have the exclusive PerfectPicture® Imaging System for: 1440 x 720 dpi • A 3-picoliter dot – the smallest in the industry, for the sharpest detail • Fast print speeds – up to 12 PPM black/10 PPM color • Fast Ethernet and LocalTalk options • PC/Mac/USB compatibility. To learn more, just call 1-800-GO-EPSON or visit us at www.epson.com.

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Epson Stylus Color 900. Ultrafast business printer.

Price may vary. The National Software Testing Laboratory, Inc. (NSTL) found that the EPSON Stylus Color 900 outperforms the average print speeds of competitive printers — up to twice as fast when printing in color applications. The NSTL report is available by calling 1-800-GO-EPSON. The NSTL testing uses typical software applications and conditions. Actual results may vary according to applications, print settings and computer configuration. Epson and EPSON Stylus are registered trademarks of Seiko Epson Corporation. PerfectPicture is a registered trademark of Epson America, Inc. ©1999 Epson America, Inc.

So Long, CDs

MP3 WILL CHANGE THE WAY YOU BUY

Everyone's talking about MP3. Not since Larry, Curly, and Moe have three characters caused such a fuss. Depending on whom you ask, it's a format for compressing and storing sound, a way to download free music from the Internet, a promotional vehicle for musicians, a piracy threat to the recording industry, or a preview of how everyone will buy and sell music in the future.

In fact, MP3 is probably all these things. But most important, MP3 is *the* hot spot in the Internet music scene. Thousands of MP3 files in every musical style, many offering near CD-quality audio, are available for downloading (some even legally). What do you need to join the band? Just a free player and an Internet connection—the faster, the better, because MP3 files routinely weigh in at 5MB or more.

It's also easy to make your own MP3s. Run your favorite audio CDs through MP3 encoding software, and you can create nearly identical copies that use a fraction of the disk space. Stash a few hours' worth of MP3s on a PowerBook hard drive, and you've got a great alternative to the in-flight movie. Buy a CD burner and software such as Adaptec's Toast, and you can burn a CD-ROM that contains roughly ten hours of music, instead of the 74 minutes an audio CD can manage.

And you wonder why recording-industry executives have trouble sleeping.

Macworld LAB TEST

Now the bad news: some of the most interesting destinations in the MP3 world have "Windows Only" signs on their doors. But the Mac is steadily gaining ground, and these days it's possible for the rest of us to participate in almost every aspect of the MP3 revolution. For links to relevant Web sites and our exclusive sound-quality comparisons, visit www.macworld.com/1999/07/features/.

Making Music Smaller

MP3 isn't new. Its origins go back to the eighties, when researchers began exploring ways to compress digital audio into less storage space. One of the standards that came from these efforts was MPEG (Moving Picture Experts Group) Audio Layer III—MP3 for short.

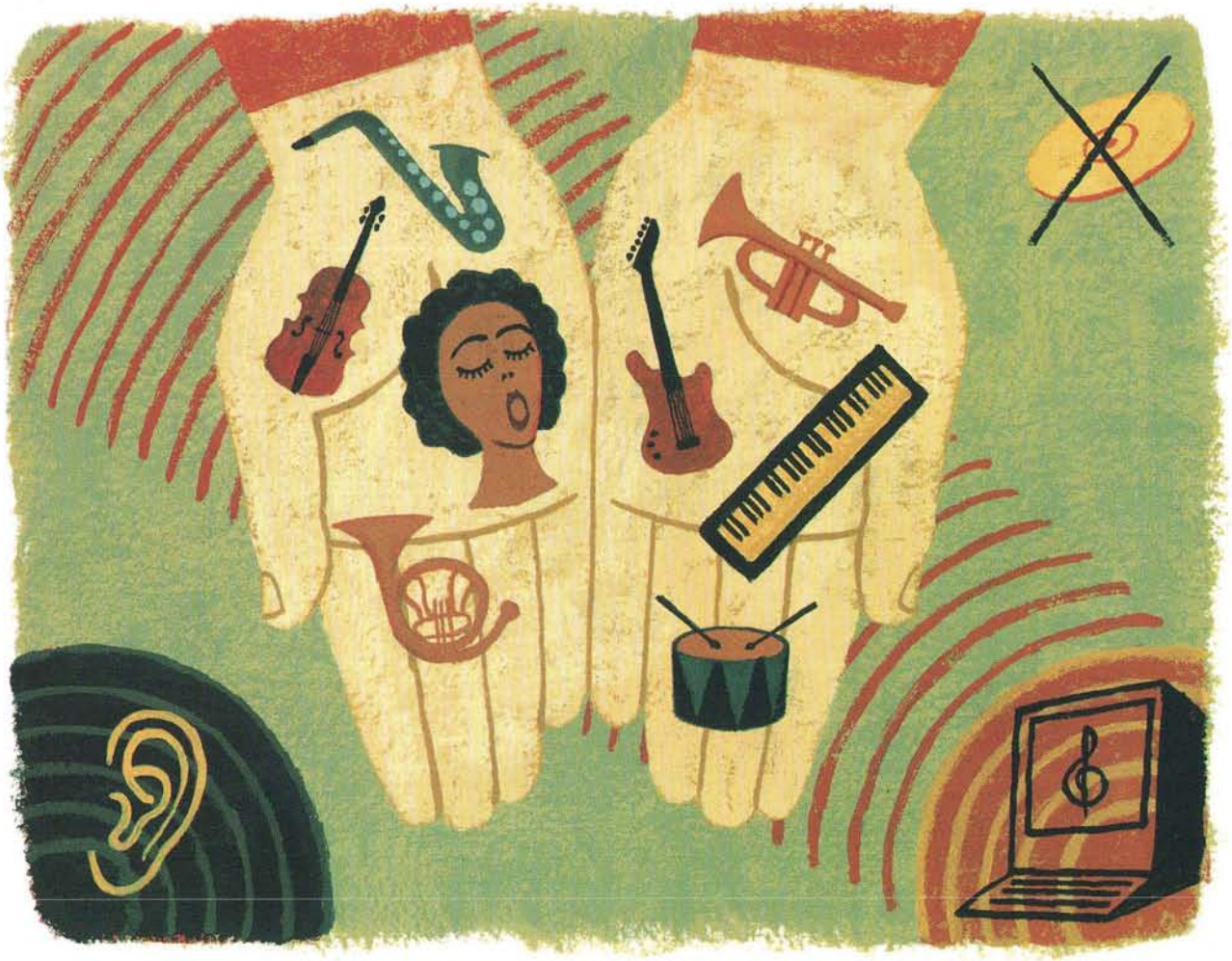
Uncompressed CD-quality stereo sound requires roughly 10MB of disk space per minute. MP3 can lower audio's appetite for storage by a factor of ten or more, and even audiophiles may have trouble hearing the difference. Like many audio compression schemes, MP3 relies heavily on *perceptual coding* techniques, which eliminate those portions of an audio signal our ears don't hear well anyway. It's similar to how the JPEG format works, compressing images by throwing away image data our eyes don't detect easily.

Variable Quality Just because a file's name ends with *MP3* doesn't mean you're getting CD-quality sound. As with all audio (and video) compression schemes, the quality of an MP3 file depends on how it's been compressed.

MP3 measures compression settings in terms of a file's *bit rate*—the average number of bits required for one second of sound. To obtain near CD-quality audio, MP3 requires a bit rate in the range of 128 to 192 kilobits per second.

Most high-quality MP3s on the Internet are encoded at 128 Kbps. As you can hear in our online examples, this yields near CD-quality sound. A 64-Kbps rate yields sound roughly equivalent to an inexpensive FM radio. At lower bit rates, you start to hear that swirly, shortwave-quality audio most commonly associated with RealNetworks' RealAudio and other streaming technologies.

Forget Streaming It's obvious that a 128-Kbps sound file can't download over a 28.8-Kbps modem *and* play at the same time. In this regard, MP3 doesn't compete with streaming-media systems such as RealAudio and RealVideo. You can listen to a RealAudio feed within seconds of clicking on a link, but if you're downloading a high-quality MP3 file via a modem,



AND LISTEN TO YOUR FAVORITE MUSIC

you may wait half an hour before hearing the first note. This is why some MP3 music sites also provide RealAudio clips that let you preview tunes before committing to long downloads.

MP3 does allow a crude form of real-time streaming—but with quality compromises similar to RealAudio's. In other words, if you compress an MP3 file for very low bit rates, it has that shortwave-radio fidelity common to streaming audio.

This illustrates a key point: Although MP3's compression skills are impressive, MP3 itself isn't the holy grail of audio compression schemes. The reason MP3 files sound so much better than, say, live RealAudio feeds is largely because MP3 audio isn't compressed to the same degree.

But as anyone who's followed Microsoft Windows knows, a technology doesn't have to be the best in order to become the most popular. What *does* make MP3 magic are the free or nearly free tools for playing and making MP3 files—and the staggering number of MP3 files available for easy downloading.

Steal This Song So is MP3 legal? The answer depends on where you get your MP3 files. If you've downloaded a free MP3 file from an official Web site or a clearinghouse like MP3.com (www.mp3.com), bought MP3 files from MP3-for-sale sites like GoodNoise (www.goodnoise.com), or created your own MP3 files from your personal collection of audio CDs, you're in good shape as long as you keep those files to yourself. It's even legal to convert MP3s with a utility such as Rafael Lubbert's free MPecker Drop Decoder and burn them onto standard audio CDs, so long as they're for your personal use.

But if you're downloading albums by commercial recording artists in MP3 format, chances are pretty good that you're engaging in music piracy.

BY JIM HEID

ILLUSTRATIONS BY JAMES STEINBERG

Pontis Electronics' MPlayer3 is a forthcoming Mac-compatible MP3 player.

Auditioning MP3 Players

Macworld Lab tested five Mac MP3 players: @soft's MacAmp 1.0 (a shareware product still in beta testing at press time); Norman Franke's free SoundApp 2.6; Oliver Dreer's free beta version of MPEG Audio Player 1.7; the free beta of MacPlay3 1.4, from Germany's Fraunhofer Institute, where MP3 originated; and Audioactive's free Audioactive 1.2a, a relabeled version of MacPlay3. All five are currently free for downloading, so you can try them and find out which one you like best.

Snazzy Features All of the players we tested provide playlist features that enable you to specify the playback order of a virtually unlimited number of songs (see the sidebar "Digital DJs"). And all except MacPlay3 and Audioactive enable you to save and switch between playlists, change the playback order by dragging song files up and down within the window, randomize playback order, and repeat tracks.

Interface Champs Then there's the look-and-feel. MacAmp is the hands-down coolest MP3 player for the Mac, sporting a style that wouldn't seem out of place in a bachelor pad's stereo cabinet. Better still, you can customize MacAmp by downloading *skins*—small documents that transform the program's appearance. You'll find dozens of skins at @soft's Web site, which thoughtfully includes previews that let you see what each one looks like. MacAmp also supports plug-ins that add unique display features; the version we tested included a plug-in that creates a hypnotic graph of a file's frequency spectrum.

MacAmp is also the only player with a graphic equalizer, with sliders enabling you to boost or attenuate certain frequencies. And PK Industries' $5 shareware StripAmp 1.0 gives you easy control over MacAmp from within the Control Strip.

MacAmp also has a junior sibling: the $5 shareware MacAmp Lite 1.5.1, which provides a simple, Control Strip–like interface and can play numerous audio formats in addition to MP3 files.

Finally, Oliver Dreer's MPEG Audio Player has a unique feature for varying a song's playback speed in real time. Besides letting you make the Beastie Boys sound like Alvin and the Chipmunks, this feature could be useful for musicians who want to play along with a tune or slow down a song to decipher a complex solo.

Ripping Your Own: MP3 Encoders

To make your own MP3 files, you'll need an encoder application. Some MP3 buffs also call these *rippers*, and refer to encoding a track from an audio CD as *ripping*.

We tested two encoders: Rafael Lubbert's free MPecker Encoder 1.0 (still in beta at press time) and Xing Technology's $30 AudioCatalyst 1.01. Both work well, but if you're serious about MP3, spring for AudioCatalyst.

Each program makes encoding audio CD tracks easy (see the screen shot "Speaking Encode"). You can encode one track at a time, or rip an entire CD in one fell swoop. MPecker also supports Layer II encoding, while AudioCatalyst supports a variable–bit-rate encoding scheme that can yield better sound quality but may cause playback glitches with some players (see the sidebar "MP3 Tip Sheet").

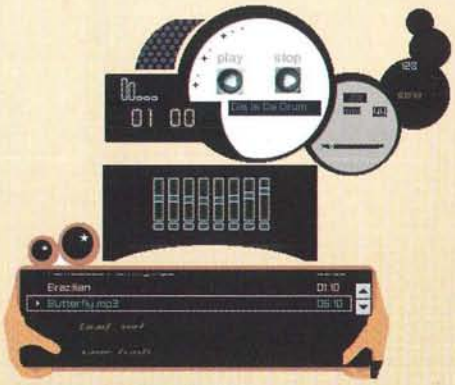
Disc Master The MP3 specification supports a tagging scheme for storing song, artist, and album information along with the encoded file. When an MP3 file contains these tags, this information appears in the MP3 player as the file plays.

Both MPecker and AudioCatalyst can add these tags, but AudioCatalyst goes the extra mile. It can connect directly to

Digital DJs

@soft's MacAmp is the premier MP3 player for the Mac. By applying downloadable "skins," you can transform the program's look-and-feel. Or use the more basic interface MPEG Audio Player offers.

MacAmp's default skin



MacAmp's highly stylized skin

The relatively staid-looking MPEG Audio Player

MP3 Tip Sheet

Helpful hints for working with MP3s.

Make 'Em Sing

You can't launch an MP3 player by double-clicking on a freshly downloaded MP3 file, because the MP3 file lacks the internal *type* and *creator* codes that tell the Mac which program to launch.

To open a downloaded MP3 file, drag it to your MP3 player's icon. With most players, you can also drag and drop an MP3 file into the playlist window.

With a disk utility such as Daniel Azuma's $10 FileTyper (available through shareware sites), you can add the appropriate type and creator codes to downloaded MP3s. To have the Mac launch MacAmp when you double-click on an MP3, change the MP3's type to MPEG and its creator to mAmp (note the capitalization).

Ripping Smart

When encoding stereo tracks for high-quality playback, start with a data rate of 128 Kbps and the Joint Stereo mode. (Joint Stereo is an encoding scheme that improves the quality of low and midrange frequencies.) For encoding monophonic tracks, you can use a 64-Kbps bit rate. Lower data rates are also ideal if disk space is tight or if you're encoding voice-only material.

Burn Your Own

To commit your MP3s to a CD (for your own use), you need a CD-ROM burner and software. The premier burning software for the Mac is Adaptec's $99 Toast (408/945-8600, www.adaptec.com). If you burn an ISO 9660–format CD, PCs and Macs alike can read it.

If you want to burn an audio CD, you need to convert your MP3s into AIFF format. You can do so with the free SoundApp utility.

the Compact Disc Database (CDDB) at www.cddb.com, an Internet-based service that contains information on tens of thousands of CDs. Load a series of tracks into AudioCatalyst, choose the Fetch Track Information command, and the program connects to CDDB and adds the information for each track. On the downside, AudioCatalyst can't read track information you may have entered already using Apple's AppleCD Audio Player utility or normalize track volumes, although Xing Technology says those features will be a part of its forthcoming AudioCatalyst 2.0.

When Macworld Lab put the two utilities through their paces, AudioCatalyst came out more than twice as fast as MPecker in compressing a 4-minute Audio CD track (see the benchmark, "MP3 in a Flash"). Indeed, AudioCatalyst is fast enough to permit real-time encoding. Connect an audio source such as a tape deck or turntable to your Mac, and you can make MP3s from your favorite cassettes or vinyl albums. (Note that a turntable's output isn't strong enough to drive the Mac's audio-input circuitry; you'll need to connect a preamplifier between the turntable and the Mac.)

It's also worth noting that BIAS's (800/775-2427, www.bias-inc.com) $499 Peak 2.0 and $99 Peak LE 2.0 audio editors can also encode MP3s. There's no reason to buy either program if you simply want to encode audio CD tracks, but they would be useful if you want to edit audio before encoding it.

Fade Out

So what aspects of the MP3 craze *can't* Macs participate in? For starters, there's MP3 player hardware such as Diamond Multimedia's $200 Rio (800/468-5846, www.rioport.com). This tiny gadget (3.5 by 2.5 by 0.625 inches; 2.4 ounces) connects to the parallel port on a Windows computer and holds about an hour's worth of MP3 music. It's impressive enough to have attracted the attention of lawyers from the Recording Industry Association of America (RIAA)—last fall, the RIAA unsuccessfully sued to stop shipment of the Rio.

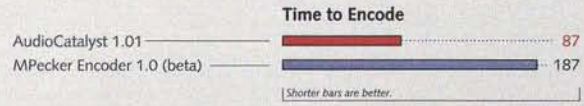
Diamond Multimedia says it's looking very hard at the

Macworld LAB TEST

MP3 in a Flash

When it comes to MP3 encoding tools, you get what you pay for. The free MPecker Encoder does the job, but it's not nearly as fast at generating MP3 files from your audio CDs as the $30 AudioCatalyst.

Best result in red. Times in seconds.

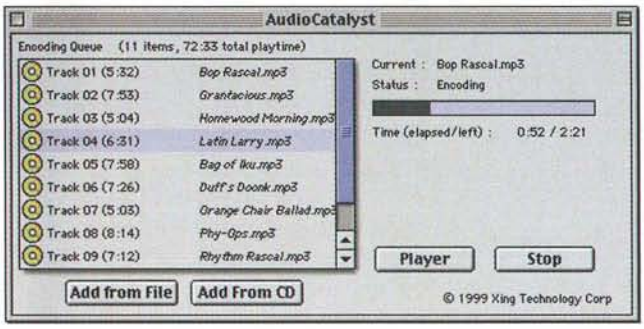


Behind Our Tests

We timed converting a 4-minute audio CD file to a joint stereo, 128-Kbps MP3 file. Our test platform was a first-generation Power Macintosh G3/300 running Mac OS 8.5.1 with 64MB of RAM and a 2MB disk cache.—**Macworld Lab testing supervised by Ulyssis Bravo**

Mac market, and it wouldn't come as a shock to see a USB version of Rio someday. In the meantime, if you're in a multiplatform office or school, you can use a Mac for downloading and encoding, and then turn to a Windows machine to load MP3s into a Rio.

Meanwhile, Germany-based Pontis Electronics is putting the finishing touches on its MPlayer3 (www.mplayer3.com), a Rio-like device that will work with Windows and Macs alike. The $159 MPlayer3 should be available by the time you read this. Numerous other companies are working on similar devices, including ones that fit in a car's dashboard (see www.mp3.com/hardware/).



Speaking Encode Xing Technology's AudioCatalyst is the fastest, most feature-packed MP3 encoder for the Mac. We retrieved all of the track names listed here from the Internet's massive Compact Disc Database.

Streaming Servers Windows also has the edge in MP3 streaming. Nullsoft, the maker of WinAmp, the Windows world's most popular MP3 player, has developed an MP3 streaming system called Shoutcast (www.shoutcast.com). The Windows- or Unix-based Shoutcast server, which you need for streaming your MP3s to the world, is free for noncommercial purposes; commercial users pay $299. A related, Windows-only program called MP3Spy (from the company of the same name at www.mp3spy.com) lets you locate Shoutcast stations and chat in real time with other listeners.

Shoutcast is fun, but RealNetworks' RealAudio streams more reliably, has good Mac support, and is far more popular for live streaming. By the time you read this, RealNetworks' free RealPlayer will also support MP3 streaming.

The Last Word

MP3 is a grassroots groundswell—its popularity comes from millions of enthusiasts embracing an open standard. But Big Business has taken notice. Several companies (including Microsoft) are now promoting MP3 enhancements or alternatives they say provide better quality, piracy protection, the ability to purchase songs you download, or all three. We've stashed some links to relevant Web sites at www.macworld.com/1999/07/features/.

MP3's ubiquity has made it a de facto standard for high-quality compressed digital audio. On the Mac, the tools of choice are @soft's MacAmp for playback and Xing's AudioCatalyst for encoding. But given that nearly all MP3 tools are free, there's no reason not to try the other programs reviewed here, too. Use them honestly—to play legally distributed MP3s and to make MP3s of your own CD tracks—and you'll discover new artists and get more out of your own music library. **m**

A contributor to *Macworld* since 1984, Contributing Editor JIM HEID (www.heidsite.com) specializes in Web and digital-media technologies.

Music for the Masses: MP3 Players and Encoders

Developer	Product	Mouse Rating	Price	Contact	Comments
MP3 PLAYERS					
@soft	MacAmp 1.0	NA*	NA**	www.macamp.com	The Mac's best MP3 player is fully featured, customizable, and cool.
	MacAmp Lite 1.5.1	♦♦♦♦	$5	www.macamp.com	Has solid playback and playlist features with a simple, Control Strip–like interface.
Audioactive	Audioactive Player 1.2a	♦♦½	free	www.audioactive.com/player/	Has bare-bones playlist features; other players are better choices.
Oliver Dreer	MPEG Audio Player 1.7b3	NA*	free	www3.pair.com/odreer/mpeg.html	Has clean interface; the only player that can vary playback speed.
Norman Franke	SoundApp 2.6	♦♦♦♦	free	www-cs-students.stanford.edu/~franke/SoundApp/	Lacks MacAmp's glitz, but can play and convert numerous non-MP3 formats.
Fraunhofer Institute	MacPlay3 1.4b2	NA*	free	www.iis.fhg.de/amm/download/	Has bare-bones playlist features; other players are better choices.
MP3 ENCODERS					
Rafael Lubbert	MPecker Encoder 1.0b14	NA*	free	www.anime.net/~go/mpeckers.html	Has wide range of quality settings, including Level II support, but much slower than AudioCatalyst.
Xing Technology	AudioCatalyst 1.01	♦♦♦♦	$30	805/783-0400, www.xingtech.com	Is bargain-priced, elegant, and fast enough to support real-time encoding.

*NA = not applicable. * Final version wasn't shipping at press time ** Shareware price of the final version had not yet been announced.*

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Steve Jobs, Apple Computer, Inc., Interim CEO, July 21, 1999

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A great way to start the conference! Hosted by MACWORLD Expo conference chairperson Paul Kent and Mac industry stalwart Bob "Dr. Mac" LeVitus, this opening session of MACWORLD Expo/New York is your opportunity to hear experts from all corners of the Mac community speak on a variety of subjects. The MACWORLD Expo Town Meeting features lectures, debates, performances, cool demos and interactive discussions. *Open to all conference and/or workshop attendees.*

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Net Innovators
Digital Media Studio Featuring QuickTime™
MACWORLD Expo Digital Art Gallery
Extensions Workshop for Creative Content

Visit the MACWORLD Expo Web site frequently for an updated list of companies participating in the Special Interest Environments.

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Get the most from your Mac- based products, learn about new and emerging technologies and explore hot topics. Delve into the new Mac OS products that are shaping the Mac market. The Macworld/Pro conference programs take you inside these fast-growing areas:

- **Macintosh Networking and Communications** - Learn techniques and technologies associated with deploying Macintosh LANs, WANs, Internet/Intranets and remote access. Get the most from your existing network or learn how to make it state-of-the-art.

- **Digital Video** - Sessions in this track will give you expert analysis and direction for producing video on your Mac and delivering video from your desktop.

- **QuickTime™** - QuickTime™ is changing the way people communicate ideas and information. Learn how to produce optimized QuickTime™ content in these exciting sessions.

- **Web Development** - Make the most of your organization's Web presence with exciting techniques learned from these sessions.

- **Advanced Techniques** - Go inside some of the hottest Macintosh technologies in the Advanced Techniques Track and discover ways to extend the platform and make it work for you more powerfully than ever before.

- **Color** - Learn the basics of color theory and deployment of Apple's ColorSync technology; see how creative content designers are providing their customers precise color accuracy in their proofing and finished products.

- **PDF** - Attend sessions in this Portable Document Format (PDF) track to gain an in-depth understanding of how to successfully deploy PDF, work around it's limitations and maximize its potential.

- **Creative Industry Issues** - Hear from industry experts how to be more profitable, more efficient and more employable in the creative industries. You'll gain practical knowledge that will help you run a leaner, meaner and more productive creative group.

- **Managing the Mac Platform** - Features sessions that look at the needs of organizations using the Mac, and presents methods, practices and technologies that are defining the role of the Macintosh manager.

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Let the professionals teach you how to use your Mac at work, at home, in the classroom and on the road!

Whether you use your Mac at home or at work. In your home office, your classroom or on the road, this conference will show you how to get more out of the work you do, the things you learn or teach, the games you like to play and more. An array of information-packed sessions taught by world-class instructorsenhances your skills, raises your productivity, and makes your Mac experience more enjoyable with these Tracks:

- **Maxing Your Mac** - Put your Macintosh in full throttle and squeeze every bit of performance out of it. Whether you're working with an old Mac or the latest model, you'll get sound advice and useful tips from experts.

- **Inside Apple Technologies** - Inside your Macintosh are some of the most advanced and innovative system technologies. Gain in-depth understanding of these technologies and learn how to use them to develop some of the coolest computing solutions.

- **Top Tools** - These sessions will unlock the secrets of your favorite programs and get you up to speed quickly with advanced features you didn't know were available.

- **Crash Courses** - Attend the Crash Courses for a quick hit of technology explanations to help make you a more informed Mac user.

- **The Mac in Small Business** - It has never been easier to use Macintosh technology to launch and operate a small company, home-based business or telecommute from your home. Learn from experts how to put technology to work for you.

- **MACWORLD Expo Gallery** - Creative people have always chosen the Macintosh. This track features renown artists from the Mac community demonstrating their dazzling works and explaining how they use Mac-based tools to achieve stunning success.

- ***Macworld* Magazine Presents** - *Macworld's* editors, columnists and featured guest speakers present the hottest topics straight off the pages of the industry's premier publication.

- **Macs in Education** - The Macintosh paradigm for computing ease-of-use has made it the platform of choice for educators world-wide. This track showcases innovative applications and techniques that can enhance both learning and teaching opportunities.

- **Goodies** - These presentations and ideas will put a smile on your face and demonstrate things that are cool for cool's sake. Join fellow members of the Macintosh community as we celebrate technology in this wild, weird and wonderful track.

Pre-Conference Workshops

Make the most of your time at MACWORLD Expo/New York — spend an entire day getting in-depth training before the conferences and exhibits begin. Visit the Web at www.macworldexpo.com for complete workshop descriptions.

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Early Discount Registration Form for MACWORLD Expo/New York 199

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Choose your package and fill out the form completely. Incomplete forms will be returned unprocessed. Please use one form per person; make photocopies for additional people.

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country | telephone | extension

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PRIORITY COD

2 Registration Package Selection & Fees

Town Meeting and Pre-Conference Workshops: July 20, 1999 ● Conference Sessions and Exhibits: July 21-23, 1999. All Conference Sessions, Keynote Address and the Town Meeting are on a first-come, first-served basis with the exception of the Pre-Conference Workshops.

		Early Discount by June 21	Regular Price after June 21
W (write in your workshop session code)	❑ Package 1: SUPER PASS	$1,095	$1,195
	Includes: Pre-Conference Workshops, Macworld/Pro Conference Sessions, MACWORLD Expo Users Conference Sessions, Keynote Address, Exhibits, Town Meeting		
	❑ Package 2: Macworld/Pro Conference	$795	$845
	Includes: Macworld/Pro Conference Sessions, MACWORLD Expo Users Conference Sessions, Keynote Address, Exhibits, Town Meeting		
W (write in your workshop session code)	❑ Package 3: MACWORLD Expo Users Conference & Full-Day Pre-Conference Workshop	$515	$565
	Includes: Pre-Conference Workshop, MACWORLD Expo Users Conference Sessions, Keynote Address, Exhibits, Town Meeting		
W (write in your workshop session code)	❑ Package 4: Full-Day Pre-Conference Workshop	$395	445
	Includes: Pre-Conference Workshop, Keynote Address, Exhibits, Town Meeting		
	❑ Package 5: MACWORLD Expo Users Conference	$195	$225
	Includes: MACWORLD Expo Users Conference Sessions, Keynote Address, Exhibits, Town Meeting		
	❑ Package 6: Exhibits ONLY	$29	$45
	Includes: Admission to the exhibits ONLY. Does NOT include admission to the Keynote Address.		

3 Attendee Profile (must be filled out to process your registration)

For What Purpose Are You Purchasing/ Evaluating Products and Services?
- ❑ 1. For my Company/Organization/Department
- ❑ 2. For Myself as a Consultant/Sole Proprietor
- ❑ 3. For Myself as Consumer

What is Your Industry? (CHECK ONE ONLY)
- ❑ 4. Accounting/Finance
- ❑ 5. Aerospace
- ❑ 6. Architecture/Construction/Process Industries
- ❑ 7. Art/Design/Creative Services
- ❑ 8. Arts & Entertainment
- ❑ 9. Computer Reseller/VAR/VAD/Service
- ❑ 10. Consulting
- ❑ 11. Education: K-12
- ❑ 12. Education: Higher Ed
- ❑ 13. Education: Other
- ❑ 14. Engineering/R&D
- ❑ 15. Gaming
- ❑ 16. Government/Military
- ❑ 17. Health/Medical Services
- ❑ 18. Legal Services
- ❑ 19. Manufacturing (Computer Industry)
- ❑ 20. Manufacturing (Non-Computer Industry)
- ❑ 21. Marketing/Sales/PR/Communications
- ❑ 22. Printing/Publishing
- ❑ 23. Transportation
- ❑ 24. Utilities
- ❑ 25. Other _____

What is Your Job Function? (CHECK ONE ONLY)
- ❑ 26. Art Director/Graphics
- ❑ 27. Consultant
- ❑ 28. Controller/Treasurer/Accounting/CFO
- ❑ 29. Corporate Executive
- ❑ 30. DP/IS Management/CIO
- ❑ 31. Editorial/Writing
- ❑ 32. Educator
- ❑ 33. Engineering/Scientific/R&D
- ❑ 34. Human Resources
- ❑ 35. Management/Department Head
- ❑ 36. Marketing/Sales
- ❑ 37. Network Management
- ❑ 38. Professional (Lawyer, Doctor, etc.)
- ❑ 39. Programming/Analysis
- ❑ 40. Purchasing
- ❑ 41. Software Developer
- ❑ 42. Training
- ❑ 43. Other _____

What is the size of your Organization?
- ❑ 44. Under 50
- ❑ 45. 50-99
- ❑ 46. 100-499
- ❑ 47. 500-999
- ❑ 48. 1000 & Over

Which Personal Computers Do You Use? (Check all that Apply)
- ❑ 49. Macintosh Powerbook Series
- ❑ 50. Macintosh Performa Series
- ❑ 51. Macintosh Quadra Series
- ❑ 52. Macintosh Workgroup Series
- ❑ 53. PowerMac
- ❑ 54. iMac
- ❑ 55. PowerMac G3
- ❑ 56. PowerBook G3
- ❑ 57. IBM PC or Compatible Desktop
- ❑ 58. IBM Laptop/Notebook
- ❑ 59. Other _____

Are the Computers at Your Organization Networked?
- ❑ 60. Yes
- ❑ 61. No

4 Payment Method (You will be charged for all registrations received including duplicates.)

Payment must accompany form for registration to be complete. DON'T PAY FOR THIS EVENT TWICE! You will be charged for all registrations received and will not be refunded for duplicate registrations. Please use one method of registration only. **All Registration fees are non-refundable and credentials are non-transferable.** A $20 fee will be charged for all returned checks. Purchase orders will not be accepted.

❑ Check enclosed (make payable to MACWORLD Expo). Enclose both check and registration form in envelope.

❑ MasterCard ❑ Visa ❑ American Express Amount $ _____

Account Number _____ Expiration Date _____

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5 Pre-Conference Workshop Key and Registration Information

WORKSHOP KEY:

Tuesday, July 20: 12:00 p.m. - 7:00 p.m.

- **WA:** Practical Introduction to Mac Networking
- **WB:** Desktop Publishing: The Big Picture
- **WC:** Creation of High Quality Photographic Web Content
- **WD:** Macintosh Network Administration with the Apple Network Administrators
- **WE:** The QuickTime™! Professionals Workshop
- **WF:** How to be a Mac Power User
- **WG:** Getting Started with Applescript
- **WH:** An Introduction to WebObjects Development
- **WI:** Java Script and Dynamic HTML Wizardry
- **WJ:** Macintosh Audio Solutions for Real World Challenges

Workshops are subject to change, please visit the Web at www.macworldexpo.com for the most up-to-date information.

REGISTER NOW!

Use ONE of the following methods to register with this form:

WEB: www.macworldexpo.com THROUGH 7/14/99. Registrations received after 6/2199 will be charged at regular pricing.

PHONE: 800-645-EXPO or 781-551-9800 outside of the U.S. ($5 service fee does apply) THROUGH 7/14/99. Registrations received after 6/21/99 will be charged at regular pricing.

MAIL TO: MACWORLD Expo/New York P.O. Box 9103, Norwood, MA 02062-9103. THROUGH 6/21/99 ONLY.

FAX: 781-440-0359. Faxed registration form must include credit card information THROUGH 6/21/99 ONLY.

BADGE INFORMATION

- Confirmation of registration will be sent once registration is processed.
- U.S. badges will be mailed after 7/5/99 for registrations received by 6/21/99.
- All international (including Canadian) attendees must pick up badges on-site at the On-site Badge Pick-up counter.
- If you register between 6/21/99 and 7/14/99 you must pick-up your badge on-site at the On-site Badge Pick-up counter located in the Southside of Crystal Palace.
- On-site Registration/Badge Pick-up Hours:
  July 19: 2:00 p.m. - 6:00 p.m.
  July 20-22: 8:00 a.m. - 6:00 p.m.
  July 23: 8:00 a.m. - 4:00 p.m.

Secrets

Unlock Your Printer's Potential

COAX THE BEST POSSIBLE PRINTS FROM YOUR COLOR INK-JET PRINTER

by Joseph Schorr

The color-printing revolution is here. Print quality from consumer-level ink-jet printers has soared over the last couple of years, while prices have plummeted. For less than $300 you can buy a color printer that cranks out gorgeous full-color glossy photographs.

But even with high-quality, affordable color printers from Epson, Hewlett-Packard, and Canon now available, printing is often the biggest disappointment for newcomers to the world of digital photography. Images look bright and crisp on screen, but when you try to print them on paper, the results look washed out and crude. It's easy to assume that your printer is simply not good enough to do the job.

That's because creating dazzling digital prints takes more than using the correct printer; it requires a little printing know-how.

CHRIS LENSCH

Don't Skimp on Paper Quality

In the world of color ink-jets, the type of paper you use has a huge impact on print quality. Plain copy paper may be inexpensive, but it doesn't make for the best digital photos. Plain paper tends to be too absorbent for most ink-jets, causing blurred images and damp printouts.

Generally, there are three grades of paper available for most printers: plain paper (the kind you use in most photocopiers and laser printers); a "premium" ink-jet paper that has a whiter, smoother finish on one side; and a photo-quality paper with a glossy surface for printing photos. Some companies, such as Epson, also offer an even more expensive glossy film (polyethylene material rather than paper) that lets you print photos that have more of the look-and-feel of traditional photographs.

For the best results at the lowest cost, try using plain ink-jet paper to create preliminary test prints. Then break out the good stuff (which can cost up to a dollar or two per sheet) to print glossy photos. To get great-looking photos, you simply can't skimp on the paper.

Pick the Optimal Resolution

One of the most common printing mistakes has to do with using the wrong resolution. For best results, make sure the pictures you print have a resolution of at least 300 dots per inch (dpi). Lower-resolution images, such as those you may see on a Web page, may look fine on screen because most computer monitors display images at a considerably lower resolution (usually between 72 and 96 dpi). But they look jaggy and out of focus printed on a high-resolution printer. Even a 1,440-dpi printer will do a terrible job on 72-dpi

continues

images. Don't forget to take scaling into account, too. If you start with a 300-dpi image but scale it by 200 percent to make it fit nicely into a page on your newsletter, you'll reduce its effective resolution to 150 dpi and the image quality will be lower in the final printout.

On the other hand, there's also no benefit to using pictures that have too high a resolution. Saving a photo at 1,200 dpi when you have a 720-dpi printer won't make the finished picture look any better; it will just take longer to open and edit the image. The image will also waste space by taking up much more room on your hard disk.

Tweak Your Pictures

Virtually every digital camera and scanner comes with an image-editing program, such as Adobe PhotoDeluxe, that lets you change the brightness, contrast, and color balance of your pictures. Consider such image editing a necessary step. Many ink-jet printers tend to render images a bit darker than they look on screen. Use your software to compensate for this by brightening images slightly before you print them. Once you get to know your printer, you'll be able to make the right adjustments so that the printed images look more like the original photos.

Use Optional Photo Inks

Some printers, such as the Epson Stylus Photo Printer, come ready to produce photos right out of the box, but others (some Canon models, for example) require a special six- or seven-ink photo cartridge that has to be swapped in for the standard color ink-jet cartridge. Because printers equipped with such cartridges work with a broader palette of ink colors (usually a light cyan, light magenta, and light yellow in addition to the standard CMYK), they can render the subtle tones of a photograph with much greater accuracy. Check to see if a photo-ink cartridge is available for your printer. Swapping cartridges in and out can be a hassle, but it is worth your while.

The Cost of Color

COLOR PRINTERS ARE MORE AFFORDABLE THAN EVER, BUT THE COST OF color printing involves more than just the printer—there's also the cost of ink and paper, which can really add up. Canon's high-gloss photo film, for example, lets you print out pictures with the look-and-feel of photographic glossies, but it costs $17.95 for ten sheets—or $1.79 per sheet.

The small ink cartridges found in most ink-jet printers don't last long, either. A photo-ink cartridge for one Canon printer, for example, costs $44.50 and is rated to last up to 90 pages—but that's assuming that the ink covers only about 15 percent of the page. In reality, when printing full-blown color photos, most photo-ink cartridges have the capacity for only a fraction of their official page yield. If you print full-page images using your printer's highest resolution settings, you may find yourself replacing ink cartridges after only 20 pages—or fewer.

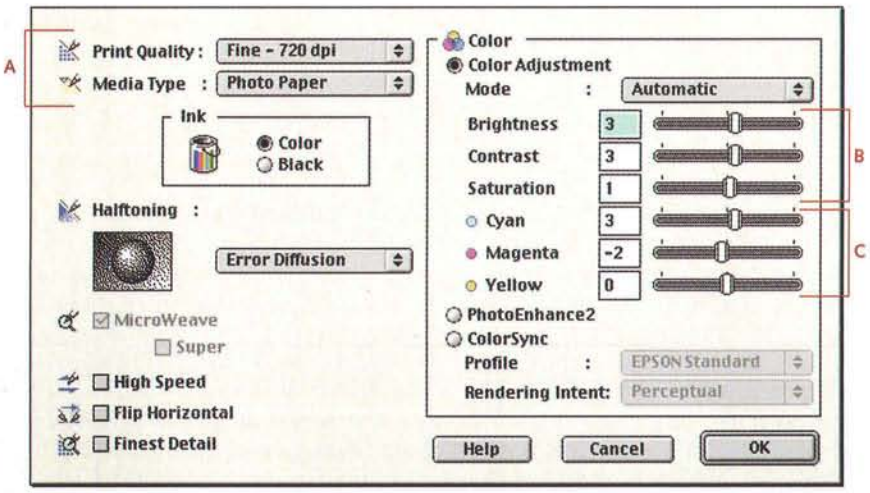
So follow a few rules of conservation: Always proof your work on plain paper rather than on the high-priced film stock. Also, try proofing your work by printing at a lower resolution—printing at 720 dpi uses less ink than printing at 1,440 dpi.

Use the Right Printer Settings

Ink-jet printers generally aren't equipped with many switches, levers, or buttons. Instead, most of the controls are found in the printer's software (the driver) that gets installed on your computer. The printer driver provides the options you see when you use the Print command from within a software program (see "Fine Tuning").

Understanding this software is vital if you want to get the most out of your printer. For example, you usually have to use the printer-driver software to set the printer's output quality (such as normal, best, and photo quality) and tell the printer what kind of paper you intend to feed through it. Changes in these settings affect how much ink the printer will spray on the page. Using the wrong settings can yield terrible results. The printer driver also lets you calibrate your printer's overall color balance, dialing up more cyan, for example, or turning down the magenta. If you're ignoring this software—and simply hitting Print without adjusting any settings—you may not be tapping into some of your printer's best features.

Admittedly, some of this takes some trial-and-error experimentation, but with the right combination of printer settings, paper type, and image tweaks, you can truly do justice to your pictures and make your work look as good on paper as it does on screen. ■



Fine Tuning Deep within the Epson Stylus Photo Printer driver (as well as other printer drivers) are software controls that let you tweak the printer's output. For the best possible output, you may have to adjust these settings. **(A)** Check these settings; the defaults may not be configured for optimal print quality. **(B)** If a print looks washed out, you could try varying these settings. **(C)** Play with these settings if you experience a color shift in a printout.

JOSEPH SCHORR is a coauthor of *Macworld Mac Secrets*, fifth edition (IDG Books Worldwide, 1998).

Secrets

Tips, Tricks, and Shortcuts

by Lon Poole

How cool would it be to surf the Internet with your voice? Kham Vo of San Francisco found a way to do it with Apple's speech-recognition software, which works with most Power Macs. The software is included with Mac OS 8.5 and later but isn't installed by default, so you need to run the Mac OS Install program and do a custom installation of the Speech Recognition module. The software is also available from Apple's Software Updates site at http://asu.info.apple.com/swupdates.nsf/artnum/n11288. After installation, turn on the Speakable Items option in the Speech control panel and leave the Listening option set to Listen Only While Key(s) Are Pressed.

Now you need to create some Internet location files. You can do this in Mac OS 8.5 by typing a complete URL, such as http://www.macworld.com, in Stickies or the Note Pad; selecting the URL; and dragging it to the desktop or a folder. The Finder recognizes that you're dragging a URL and makes it a location file. You can also drag bookmarks from the Bookmarks window in Netscape Navigator or Communicator and drag favorites from Microsoft Internet Explorer's Favorites window.

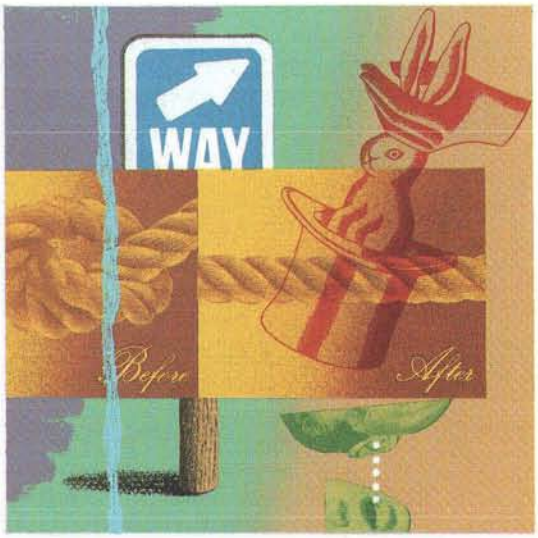
Now select the location files; hold down the escape key to get the attention of the speech-recognition software; and say into your Mac microphone, "Make this speakable." This puts aliases of the selected files into the Speakable Items folder. Open this folder (found under the Apple menu), and rename the new aliases to something easy to remember and say, such as Macworld Home Page. Or you could just rename the original location files and drag them into the Speakable Items folder.

Now while surfing the Net, you can visit any location that has a file in the Speakable Items folder by pressing the escape key and saying the file's name into your Mac microphone.

Automate DOS Suffixes

Q. At work, I share documents created on my Mac with PC users. When I forget to add a three-letter DOS suffix to the name of a document, my coworkers using PCs can't read the file. How can I automate the addition of DOS suffixes to my file names so I can make it easier on everyone involved?

DAVID J. LOURY
Mountain View, California



GENE GREIF

A. You can use Sig Software's $20 shareware NameCleaner to quickly add the correct DOS suffixes to names of files you've already saved on your Mac. A more automatic—but more complicated—approach would be to write an AppleScript that renames files based on their type and creator codes. In Mac OS 8.5 and later, you could make this a folder-action script that automatically analyzes and renames files as you add them to a folder to which you've attached the script.

Alternatively, you could ask your PC cohorts to install software that enables their computers to recognize a variety of Mac disks and Mac files (with or without suffixes). This PC software automatically supplies missing file-name suffixes based on each Mac file's hidden codes for file type and creator application. Such software includes Software Architects' $70 Here & Now (800/863-9297, www.softarch.com), Media4's $70 MacDrive 98 (800/528-7440, www.media4.com), and DataViz's $60 MacOpener for Windows (800/733-0030, www.dataviz.com).

See the Big Picture

Q. A friend who is legally blind needs his screen magnified. His old Mac had something called CloseView, but it doesn't work with Mac OS 8 on the Performa 6118 that I gave him. What can we do?

RICK LARIMORE
Los Angeles, California

A. Setting a 17-inch or larger multiscan monitor to 640-by-480-pixel resolution provides 1.5× to 2× magnification. If your friend needs more magnification, he should try CloseView 7.2.1—it works with Mac OS 7.6 and later but is not installed automatically. To get CloseView 7.2.1, run the Mac OS Install program and do a custom installation of the Mac OS module (for detailed instructions, click the Help button in the last step of the installation program). In the dialog box where you select Mac OS features to be installed, expand the Universal Access item to see and select CloseView.

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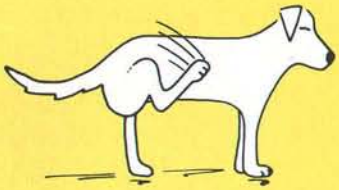

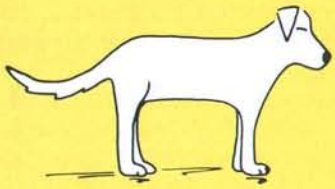

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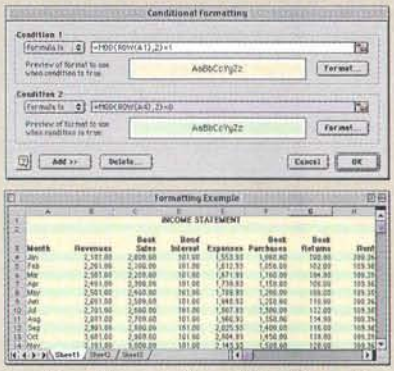
Format Like a Pro in Excel 98

APPLYING THE SAME FORMAT TO alternate rows of a Microsoft Excel 98 spreadsheet doesn't require formatting each row individually. Shane Devenshire of Walnut Creek, California, devised a method that uses Excel 98's conditional formats. With this method, you can even sort the rows without affecting the formatting. To apply this method, select the first cell you want to format (cell A1 in this example) and follow these steps.



Easy Formatting With conditional formatting in Microsoft Excel 98, you avoid labor-intensive row-by-row formatting.

1. Choose Conditional Formatting from the Format menu to display the Conditional Formatting dialog box (top).

2. Select Formula Is from the pop-up menu, and enter the formula **=MOD(ROW(A1),2)=1** in the box to the right of the pop-up menu.

3. Click the Format button, and in the dialog box that appears, click the Patterns tab, pick a color, and click OK.

4. Back in the Conditional Formatting dialog box, click Add and repeat step 2 for Condition 2, this time entering the formula **=MOD(ROW(A1),2)=0** in the box to the right of the second pop-up menu.

5. Repeat step 3, picking a different color. Click OK in the Conditional Formatting dialog box.

6. Now use Excel's Format Painter tool to copy the format in cell A1 to the entire range you want formatted. The example here is two colors (bottom), but you can extend this concept to three colors with the following formulas:

=MOD(ROW(A1),3)=1
=MOD(ROW(A1),3)=2
=MOD(ROW(A1),3)=0

You can have four colors by substituting a *4* for the *3* in the above formulas. In this case, every fourth row is not colored by the conditional formatting. You can choose to let these rows remain uncolored or select the entire range and change its color. Because conditional formatting overrides regular formatting, you'll have a four-color color scheme.

Undo That Change-All

TIP Are you amazed that AppleWorks, a.k.a. ClarisWorks, has no undo for its Change All operation? Use a macro utility, such as CE software's $119 QuicKeys (800/523-7638, www.cesoft.com), to create a macro that saves your work and then brings up the Find/Change dialog box when you press the standard AppleWorks keyboard shortcut for Find/Change (⌘-F). Now you can use the Revert command to undo a Change All. If for some reason you don't want your work saved before finding or changing, choose Find/Change from the Edit menu instead.

CLÉMENT TOPPING
Montreal, Quebec, Canada

You can also implement this idea with an AppleWorks macro that's invoked by pressing ⌘-option-F. Right after you start recording the macro, type a space and press delete to make sure the Save command is available. (AppleWorks dims the Save command if no changes have been made since the last save.) Then choose Save, choose Find/Change, and stop recording the macro.—L.P.

Banish Modal Internet Connections

TIP Tired of staring idly at a modal dialog box while your Mac dials your ISP to make an automatic Internet connection? Next time you want to browse the Web, connect instead by opening the Remote Access control panel (Mac OS 8.5) or the PPP control panel (Mac OS 7.6 through 8.1) and clicking the Connect button. Now while it's dialing, you can hide the control panel and do other tasks on your Mac as you like. When it's time

to sign off the Internet, just click Disconnect in the control panel. Once again, no modal dialog box gets in your way.

JONATHAN KURTZMAN
Brookline, Massachusetts

Visit Your Local Host

TIP Although you can copy your IP address from the Web Sharing control panel and paste it into your browser when you want to view your own Web site, an easier method to go right to your Web page, if you're using Microsoft Internet Explorer 4.X, is to type **localhost** in the address bar. Alas, this trick doesn't work in Netscape Navigator.

ALEXANDER SAVAGE
Austin, Texas

Find the Bottleneck

TIP It's not always the number of telephones or other devices plugged into a phone line that can impede modem speed (as reported in April 1999's *Quick Tips*), nor is your permanent phone wiring usually at fault. Chances are it's just one device on the line that's not within phone-company specs, and you can easily isolate it by connecting your phones and other devices one at a time and testing the modem speed. The connecting cord between a suspect device and the wall can also be a troublemaker, so try a replacement cord before dispatching the device to the dump.

HARRON K. APPLEMAN
South Salem, New York

LON POOLE answers readers' questions and selects reader-submitted tips for this monthly column. His latest book is *Macworld Mac OS 8.5 Bible* (IDG Books Worldwide, 1999).

All shareware and freeware mentioned in *Quick Tips* is available from the Macworld Online software library (www.macdownload.com).

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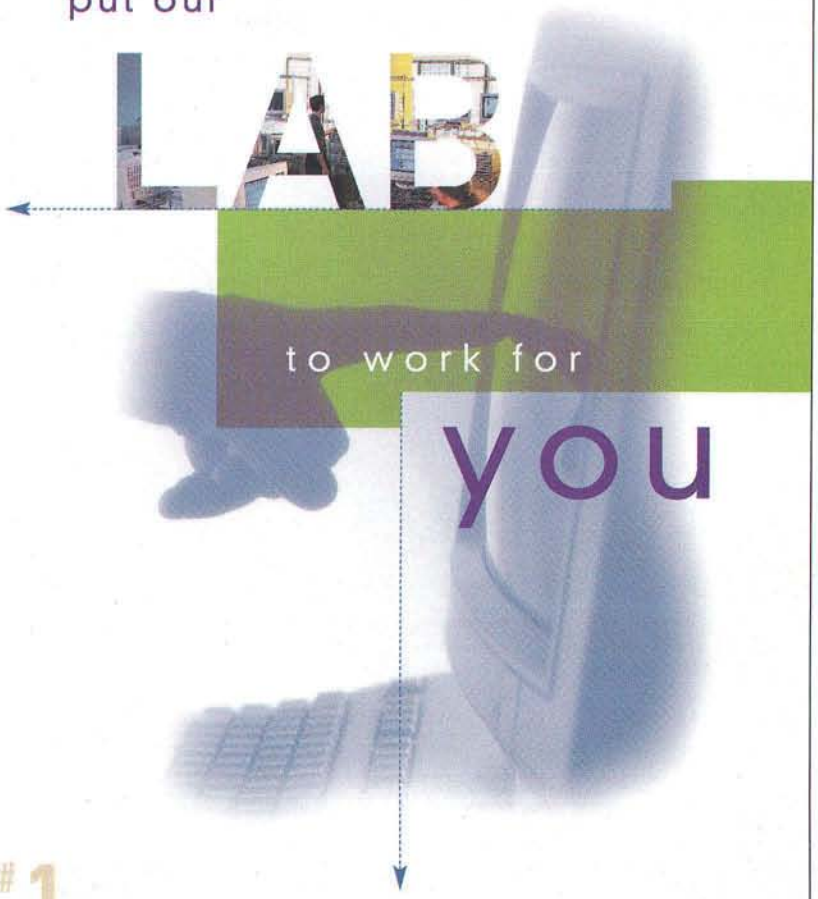

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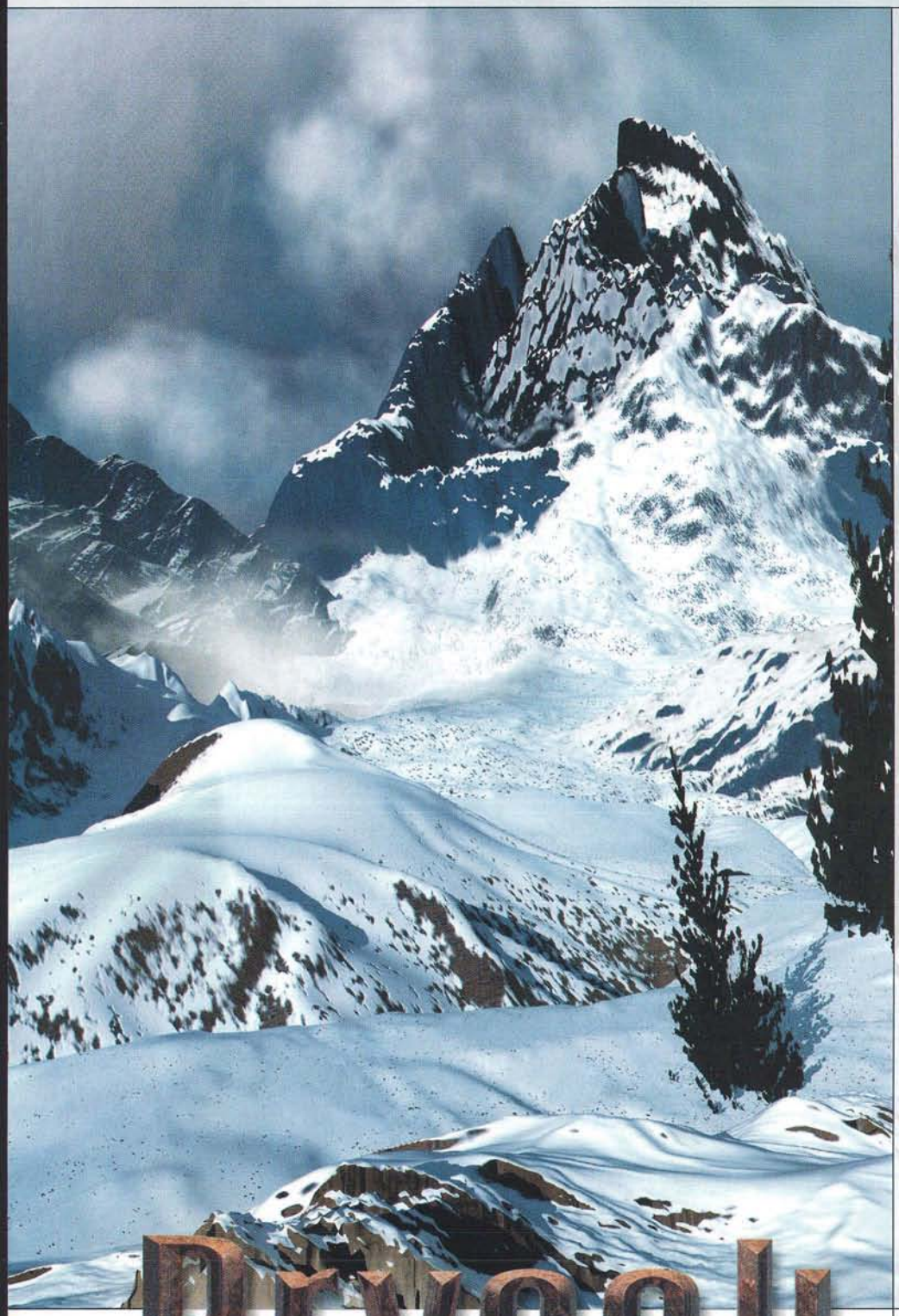
The New Landscape of 3D



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Create

After Effects 4 Expert Clinic

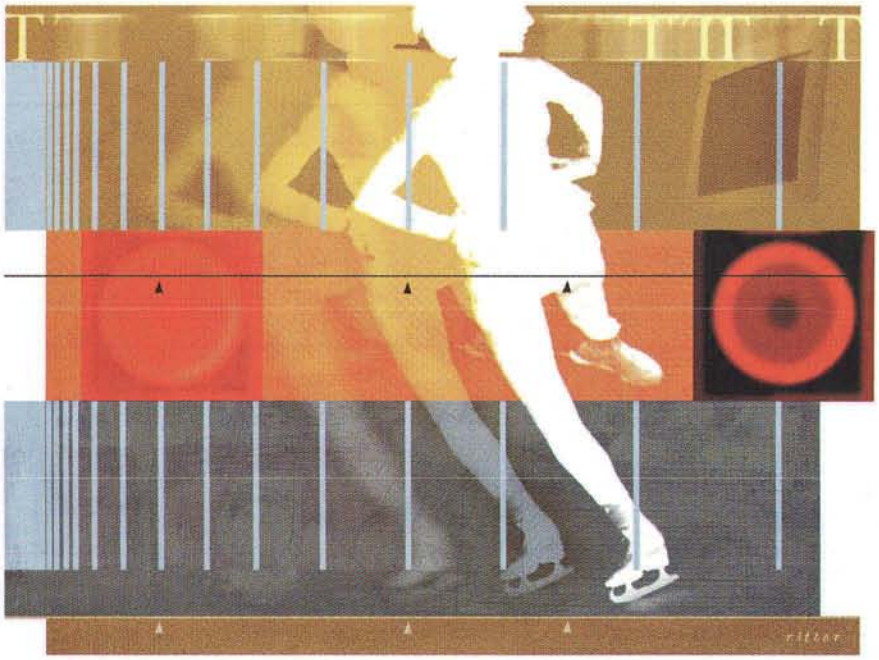
CAPITALIZE ON THIS VIDEO-EFFECTS TOOL'S SHARP NEW FEATURES

by Jim Heid

Adobe After Effects is arguably the most popular motion-graphics program in the personal computer world. Broadcasters use After Effects to create commercials and other TV graphics; film producers use it to create special effects, shooting actors against blue backgrounds and then compositing them into a scene. Multimedia producers use it when creating CD-ROM game titles, spicing up QuickTime video with special effects such as lens flare and lightning.

And now this favored eye-candy store has been remodeled. After Effects 4.0 brings improvements in performance, tighter ties to Photoshop and other Adobe programs, even more special effects, and interface enhancements both major and minor (see *Reviews*, May 1999). So where do you start?

Here's a guide to taking advantage of some of the best new features in After Effects. Unless I note otherwise, everything here applies to both the Mac OS and Windows versions of After Effects 4.0, and to both the $995 base version and the $2,195 Production bundle.



JOHN RITTER

Harness New, Better Effects

Effects are what this program is all about, and After Effects 4.0 ups the ante in several ways. Besides including numerous new effects—such as Beam, which renders laserlike light—After Effects now provides more control over how and where you can apply effects.

But browse the After Effects manual, and you'll find very little information on the specific settings of After Effects' built-in effects. Adobe yanked the gory details from the manual and put them in After Effects' new online help system. Also, check out the Read Me file that After Effects installs on your hard drive. It's different from the Read Me file on the After Effects CD-ROM, containing more last-minute details and some useful tips. Meanwhile, here's a look at some of the most compelling new effects features.

More Masking Masks, which control what's visible or hidden in an image layer, have always been an essential part of After Effects. Want to have an image visible within a piece of text? Use masks. Need to put an image on a TV set that was shut off when the original footage was shot? Again, use masks.

In After Effects 4.0, masking is greatly improved. You can have up to a whopping 128 masks per layer instead of just one, you can scale and modify masks with far more accuracy than in earlier versions, and you can copy and paste masks from Photoshop and Illustrator.

Text Paths With the new Text Path effect, you can attach text to a mask or to a path that you've drawn or imported. Use keyframes to change the text's margins over time, and you can have text race along the most complex of paths. You can also animate the text's spacing, color, and other characteristics. See "Get Your Text on the Run" for a tour and some tips.

Adjustment Layers In previous After Effects versions, if you wanted to apply the same set of effects or transformations to numerous layers, you had to laboriously copy and paste them into each layer. No more. Now, simply choose New Adjustment Layer from the Layer menu and apply the effects to the adjustment layer. After Effects applies your modifications to all the layers that appear below the adjustment layer in the Time Layout window.

Motion Sketching After Effects' Motion Sketch feature is a huge timesaver that enables you to create a com-

continues

Get Your Text on the Run

AFTER EFFECTS 4.0'S NEW PATH TEXT EFFECT PAIRS UP NICELY WITH THE IMPROVED MASKING FEATURES. IN THIS example, the text *Get your kicks on Route 66* attaches itself to the shape of a highway sign and then takes a spin around the sign's contours. You can see a QuickTime movie of this effect at www.macworld.com/1999/07/create/. Here's how to do it.

Part I:
Create the Path in Photoshop

First you need to create the original path in Photoshop. Here I used a simple road-sign outline that I imported from Adobe Illustrator.

1. Create a selection whose shape matches that of the mask. For this example, I just selected the road-sign shape (A) with the magic-wand tool.
2. In the Paths palette, click on the Make Work Path button (B).
3. In Photoshop's Tools palette, activate the Direct Selection tool (C).
4. In the document window, option-click on the path you just created. Pressing option tells Photoshop to select the entire path, not just the point you click on.
5. Choose Copy from the Edit menu, and then switch to After Effects.

Part II:
Paste the Path into After Effects

Now you're ready to paste the path into After Effects, creating a mask. In these steps, you'll paste the path into a new layer, stroke it, and apply an effect to it—all capabilities new to After Effects 4.0.

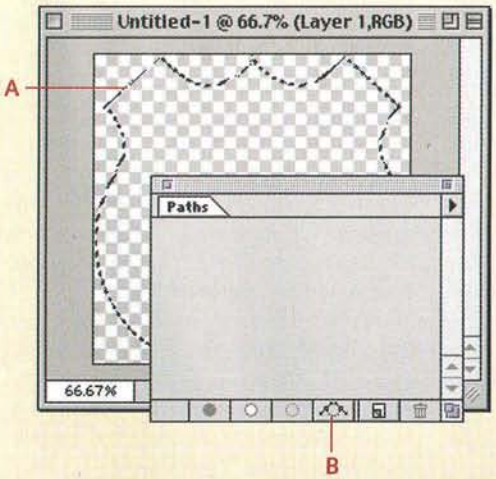
1. Open the composition that will hold the mask.
2. From the Layer menu, choose New Solid.
3. Choose Paste from the Edit menu. After Effects then pastes the mask into the solid.
4. In the Effect menu, choose Stroke from the Render submenu.
5. Specify the stroke settings in the Effect Controls window, choosing the name of the mask to be stroked here (D).

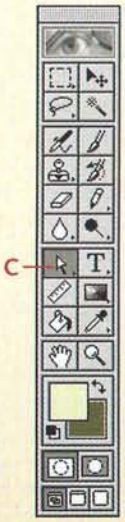
Part III:
Add the Text

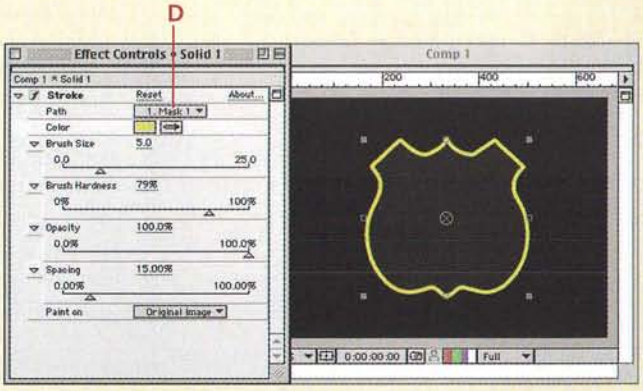
Now you're ready to add the path text.

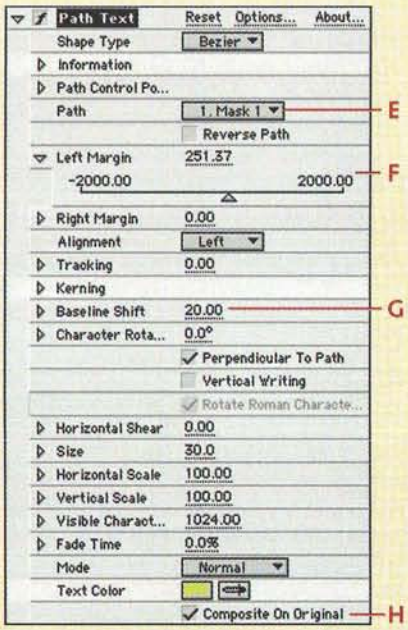
1. In the Effect menu, choose Path Text from the Text submenu. Type the text in the dialog box that appears, and choose the desired font.
2. There are a variety of ways to make text race along a path, but the easiest is to change the text's margins over time. In the Time Layout window, expand the Path Text effect and add some new keyframes for the Left Margin attribute, using the Effect Controls window to change the left-margin setting for each as shown here (F). Animating the margin with keyframes moves the text along the path.

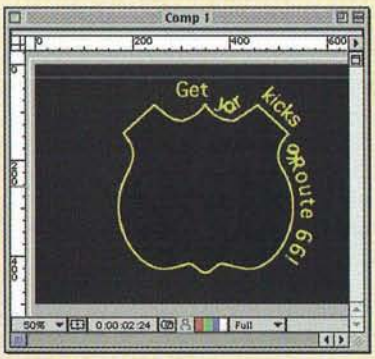
   Select the path to which the text should be attached here (E). Baseline shift (G) puts some space between the text and the stroked path. Check here (H) to display the path to which the text is attached.
3. When you're done, just render out the effect and watch the text race along the path!











Get Your Kicks When you render out the effect as created here, your text will smoothly zoom around the path.

plex motion path by simply drawing it in real time. Motion Sketch used to be included only with the high-end Production bundle, but now it's included with the base version, too.

If you're an After Effects veteran, though, you may have trouble locating Motion Sketch: it no longer appears in the Layer menu's Keyframe Assistant submenu. Its new home is the Window menu's Plug-in Palettes submenu.

Audio Additions Finally—audio is no longer a second-class citizen in After Effects. Version 4.0 includes several new audio effects for adjusting stereo panning, tweaking bass and treble, and creating echo-like delay effects. The Production bundle goes much further, providing an excellent reverb plug-in, a tone generator, a parametric equalizer, and more. Best of all, you can animate these effects over time—simulate a room expanding from closet-size to concert hall–size.

After Effects now supports audio scrubbing—the ability to hear audio in real time as you move the Time Layout window's current-time indicator. To scrub, press ⌘ (on Windows PCs, Ctrl) while dragging the current-time indicator.

Adobe also touts After Effects 4.0's ability to use Premiere-compatible audio plug-ins—of which there are many. But read the fine print: you'll see that After Effects demands plug-ins written specifically for Premiere 5—of which there are precious few.

Work Faster

Creating effects is a chore filled with enough calculations to choke Will Hunting. Here are five steps you can take to lighten the load on your computer.

1. Preview Smarter The new RAM preview feature displays speedy previews by loading content into memory and then playing it back in real time, complete with audio. But how *much* gets loaded into memory depends on the nature of your composition and on how much RAM you've allocated to After Effects.

Two factors that influence the RAM preview's duration are your composition's frame size and its render resolution. If you're working with a 640-by-480-pixel frame size, a full-resolution RAM preview will devour close to 1MB per frame. To get longer RAM preview times, lower the comp's resolution, using the Composition Settings dialog box. Dropping to 320 by 240 will enable you to preview four times as many frames.

Another way to get more out of RAM previews is to hold down the shift key while clicking on the RAM preview button (or pressing its shortcut key, 0 on the numeric keypad). Pressing shift tells After Effects to load only every other frame into RAM. The resulting preview's motion isn't as smooth, but the duration of the preview can be twice as long using the same amount of RAM.

Audio can also affect the maximum duration of RAM previews. Normally, After Effects processes audio at full resolution: 44kHz, 16-bit stereo. For RAM previews, that's usually overkill. The solution: choose Preferences from the File menu, and in the General Preferences dialog box choose a lower sample rate (such as 22kHz or 11kHz), 8-bit audio, and mono (if you don't need to preview stereo).

At the opposite end of the quality spectrum, say you do a RAM preview at full resolution and with all quality settings (motion blur, frame blending, and so forth) turned on. If you then use the Make Movie command to render a final movie, After Effects will take the RAM-based frames that it created for the preview and write them to disk. This will dramatically speed up the final render.

As for memory, the more you allocate to After Effects, the better—not just for RAM previews but for all your tasks. Use the Finder's Get Info command to boost After Effects' allocation. And turn off virtual memory—RAM preview works best with real RAM. (On Windows, these steps aren't applicable. To make as much RAM as possible available to After Effects, simply quit any other programs you're running.)

2. Render Right Video producers commonly render multiple versions of a final project: a full-screen version for videotape output, a quarter-screen version for a CD-ROM, and an animated GIF for a Web site. But too many After Effects users make the mistake of duplicating the composition in the Render Queue window and then changing the settings for each duplicate. This approach forces After Effects to recalculate each and every effect, dramatically increasing render times.

Here's the right way to do multiple versions. In the Render Queue window, select the comp and choose Add Output Module from the Composition menu.

continues

You'll see a second output module appear in the Render Queue window. Double-click on the new module, and a dialog box for changing its settings appears. This way, After Effects performs some of its hardest calculations just once and uses them as the basis for each version you create. And should you interrupt rendering to check your results, you'll have partial versions of each setting.

When rendering, you'll get faster results if you close all windows except for the Render Queue window. Or at the very least, close the Composition window so After Effects doesn't have to display a preview for each frame it's rendering.

3. Use Layout Aids After Effects 4.0 introduces new features that streamline layout. When you see rulers in the Composition window, you can create PageMaker-like alignment guides: click within a ruler and then drag down (for a horizontal guide) or to the right (for a vertical one).

To align elements quickly, use the new Align & Distribute palette in the Window menu's Plug-in Palettes submenu. This new palette works similarly to its counterpart in Adobe Illustrator.

4. Don't Neglect Caps Lock Normally, After Effects updates the Composition window every time you tweak an effect or other setting. If you're going to make several tweaks, press the caps lock key first—this defers updates and thus saves time. When you're ready to see your handiwork, press caps lock again. This shortcut existed in previous versions, but it's important enough to warrant repeated mention.

5. Master the Interface The preceding tips will make After Effects run faster. To make *yourself* run faster, master After Effects' keyboard and mouse shortcuts. Many of them, such as context-sensitive menus that appear when you control-click on something, are new to After Effects 4.0 (see "Timesaving Shortcuts").

Benefit from Family Ties

After Effects 4.0 improves on the tighter Adobe family integration that began with version 3.0. This makes life even easier for you when you use multiple apps to create your final video product. Here are the highlights.

Working with Premiere After Effects 4.0 can import Adobe Premiere projects as compositions. This enables you to use Premiere for the kinds of tasks it excels at—and for which After Effects can be cumbersome. Say you're creating a music video where rapid-fire cuts must be synchronized to a tune. Premiere's time-based design makes this a cinch, so create the cuts in Premiere and then bring the project into After Effects to apply the visual icing.

After Effects imports transitions you create in Premiere, but only as placeholders. However, it *doesn't* import transparency, motion, and filter settings, so resist the urge to apply effects in Premiere. After all, that's what After Effects is for.

Working with Photoshop After Effects 4.0 not only imports Photoshop images and retains layers but also retains adjustment layers, transfer modes, layer effects, and paths. Say you've used the Outer Glow layer effect in a Photoshop file. Bring that file into After Effects, and you not only retain the glow but can also animate it so that its color, blur, and intensity change over time—very cool!

To retain effects, remember to import Photoshop images using the Photoshop As Comp command in the Import submenu. If you import using the Footage File command, you'll lose these goodies.

Working with Illustrator Import Illustrator images using the Illustrator As Comp command, and After Effects preserves all of the image's layers, enabling you to animate them independently.

Want More?

After Effects is a robust program laden with subtleties, and a great way to learn more about it is by swapping ideas with other users. Two online resources enable you to do just that: Postforum (www.postforum.com/AfterEffects/) and Adobe's own user forum (www.adobe.com). After Effects is also a common discussion topic on several Usenet newsgroups, including rec.video.production and comp.graphics.animation.

And don't forget to just play. Set aside some time to experiment with the new After Effects, trying effects and features you wouldn't normally use. When all is said and done, that's the best way to realize the full potential of the world's most popular eye-candy store. ■

A contributor to *Macworld* since 1984, JIM HEID (www.heidsite.com) writes, consults, and lectures about digital-media and Web development.

Timesaving Shortcuts

AFTER EFFECTS IS REPLETE WITH keyboard and mouse shortcuts, and version 4.0 introduces new interface-customizing opportunities. Here's a quick roundup of some of the most useful ones.

See the Animation

You've opened a project created by a colleague—or that you created six months ago—and all of the settings in the Time Layout window are collapsed. How do you quickly find out which layers have animation keyframes assigned to them? Easy: in the Time Layout window, click on the layer and then press the U key. After Effects expands the layer to show animation values. To collapse the layer, press U again.

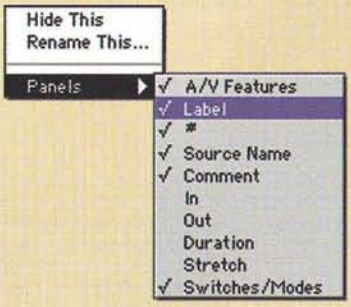
Here are some other useful show/hide keyboard shortcuts for the Time Layout window.

To Show/Hide This Property	Press
Anchor point	A
Audio levels	L
Opacity	T
Position	P
Rotation	R
Scale	S

Customize Window Labels and Columns

After Effects enables you to customize its Time Layout and Project windows to show as much or as little information as you want to see. You can change the order of many columns by dragging their headers.

To hide a column, point to it and press control. From the pop-up menu, choose Hide This. While the pop-up menu is visible, check out its other Panels options. You can now create a Comment column that enables you to annotate a tricky animation—handy for documenting a cool effect so you can re-create it.



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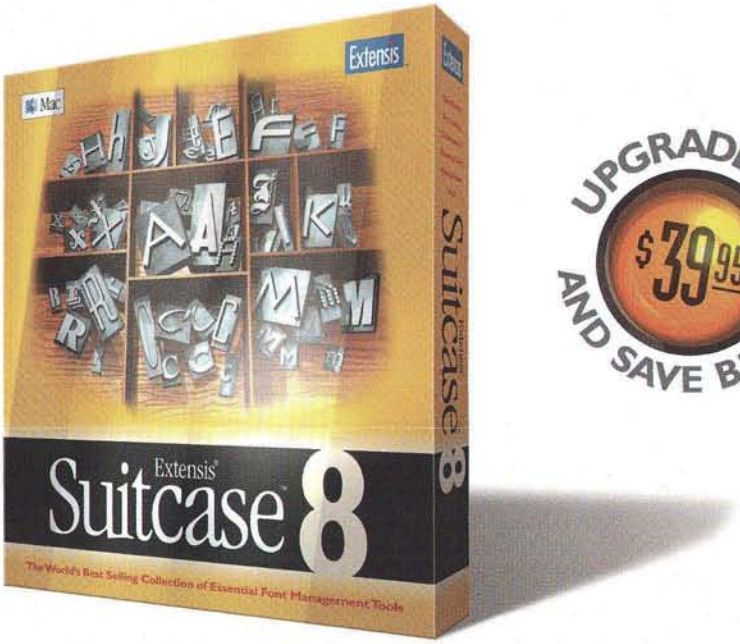
Compatible



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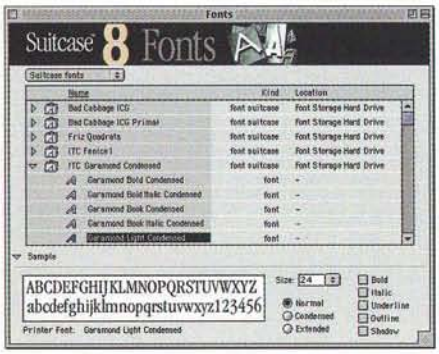

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SUMWNA010399

Create

GRAPHICS

Image Alchemy

MAKE MAGIC WITH PHOTOSHOP'S LAYERS

by Brooke C. Wheeler

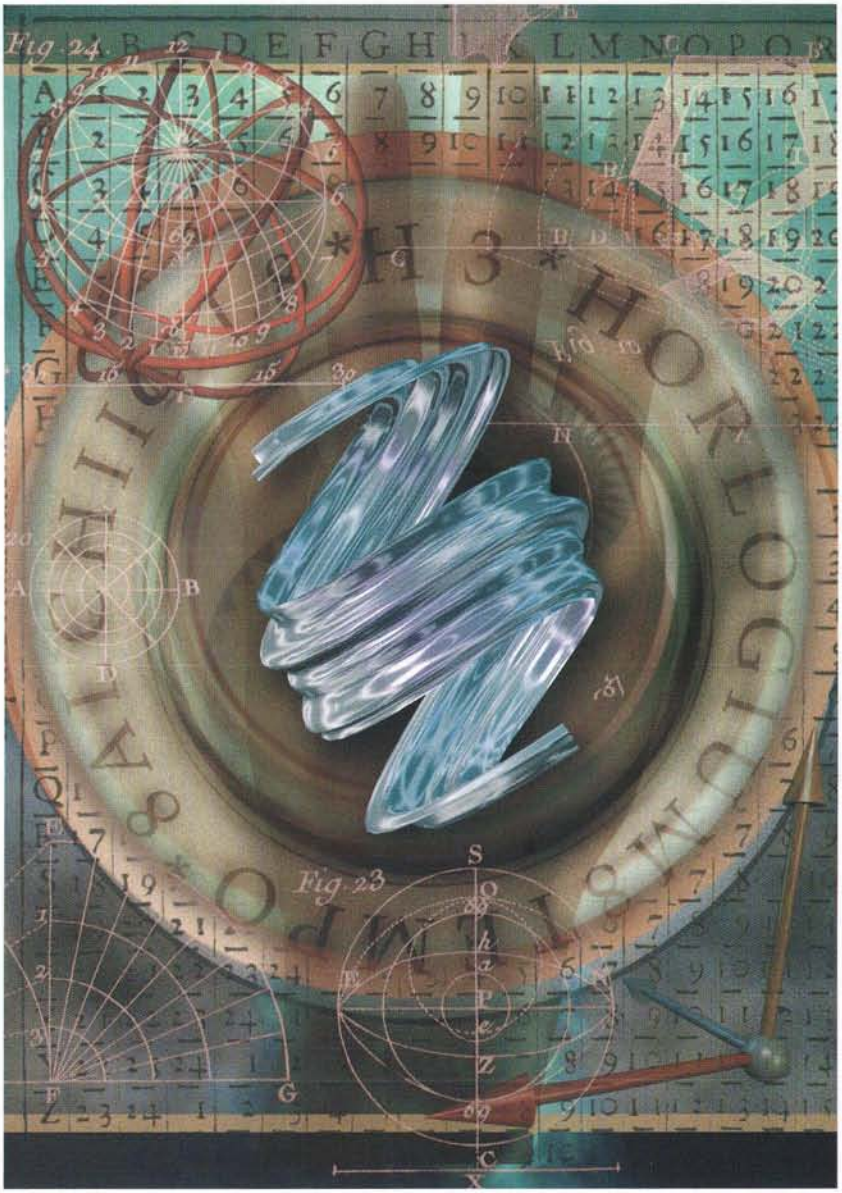
Creating layered images in Adobe Photoshop can be risky. It's all too easy to end up with art that looks like a disparate collection of flat parts. But you don't have to settle for such a look if you use Photoshop's layer-blending tools. They let you change the way pixels in different layers interact, so that in the resulting artwork the separate pieces don't look *separate*—instead they look organically interwoven.

Santa Barbara–based artist Javier Roca for years has been tackling the challenge of creating compositions that have a multitude of separate pieces. To create the artwork shown here, *The Spine*, he started by gathering images from many sources, such as old books, stock-image collections, and libraries of 2-D and 3-D art that he created himself.

Once he assembled the elements, he gave this piece that organic look by using Photoshop's layer-blending modes Multiply, Darken, and Lighten in conjunction with assorted filters. He also used duplicate layers and varied resolution to give the illusion of depth of field.

The Spine is the fourth in a five-part series of images inspired by the medieval notion that alchemists could turn lead into gold—in short, the art deals with expectation, frustration, and futility. (To view the entire series, see the online version of this story at www.macworld.com/1999/07/create/.)

To create *The Spine*, Roca used Adobe Illustrator 5 and Photoshop 4 and MetaCreations Infini-D 4 on a Power Macintosh 8500/120 with an external 4GB hard drive and a 300-dpi scanner. m



A Many Blended Thing Artist Javier Roca used Photoshop's layer-blending tools to make the shapes and colors in his piece *The Spine* merge, mingle, and interact.

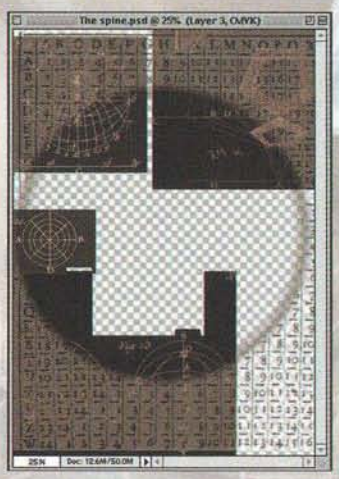
Associate Editor BROOKE C. WHEELER's "Modern-Media Girl" column at Macworld Online (www.macworld.com) highlights creative folks doing cool things with their Macs. JAVIER ROCA designs software interfaces for MetaCreations.

1 Roca first gathered all the elements. He scanned the alphabet/number grid and geometric figures from old books. He created the 3-D gyroscope, shiny metallic spiral, and three vectors himself in Infini-D and exported them as PICTs. He used Illustrator to create a lettered sundial and then rasterized it. He culled a hand outline and a photo of an X-ray from CDs of stock imagery.

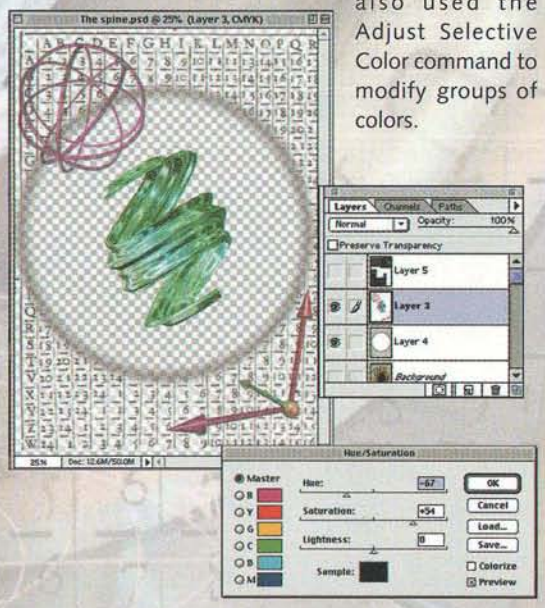
2 Roca's next step was to create the background. Since his background is made up of many images, he used filters and layer-blending modes to get interesting interplay among the elements.

He imported the sundial image into its own layer in Photoshop, applied the Noise filter, and made a duplicate of that layer. He applied the Radial Blur filter to one of the layers and then applied the Clouds filter to the whole image. Then he imported the X-ray image at low resolution and used the Multiply mode at various percentages in each layer. This created darker colors with the blended pixels.

3 Next, he imported the number/alphabet grid into its own layer; cut out a circle for the sundial shape, using the circle selection tool and the delete key; and applied the Darken mode. The next images he imported were the geometric sketches (which were first scanned in and then turned into negatives with the Invert command). After importing the sketches, he used the Colorize command to give them a sepia tone and applied the Lighten mode to that layer.



4 Many times during the process, Roca used the Adjust Hue/Saturation command in separate layers to get colors that worked together in the whole composition. He also used the Adjust Selective Color command to modify groups of colors.



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Create

Invigorate Your Site with JavaScript

MAKE YOUR SITE STAND OUT WITH EXTRAORDINARY EFFECTS

by Dori Smith

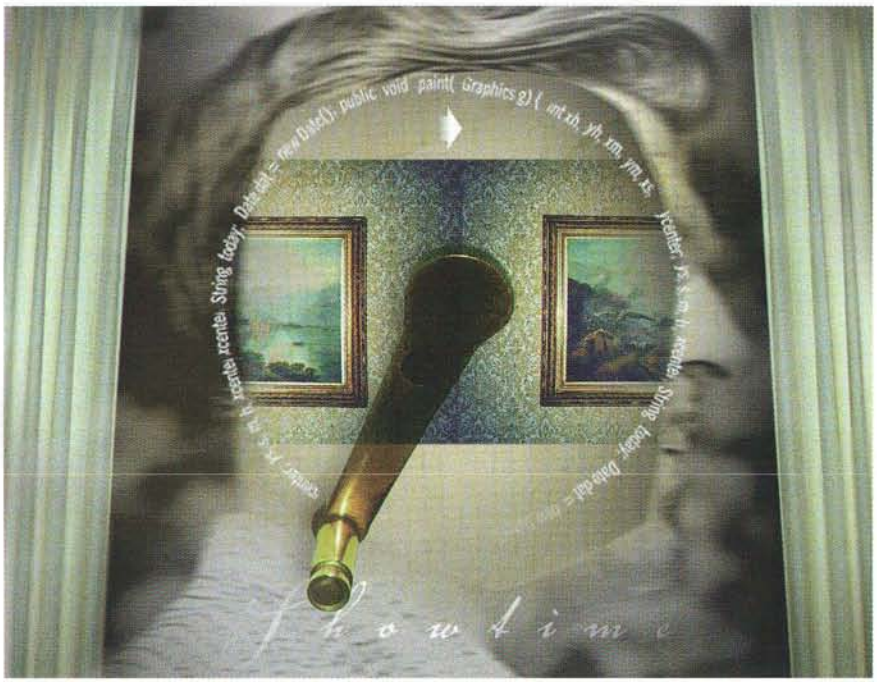
The Internet has become a competitive place these days. You have to vie with more people than ever for the attention of potential clients—and guess what, yours isn't the only site that has animated images and plug-in detection. What can you do to make your site stand out?

One way is to use effects that make your site dynamic. Rather than presenting static information, which is what you get with HTML alone, you can bring your Web pages to life by adding some JavaScript (an easy-to-learn scripting language). But it's not enough to use the same JavaScript effects already prevalent on the Internet. For instance, image rollovers (images that change when a user moves the cursor over a button or link) make a site interactive, but you see them everywhere. And that annoyance, the scrolling status bar (another JavaScript effect), is better off dying its long-deserved death. What really breathes new life into a Web site is some original use of JavaScript.

This article demonstrates a new way you can use JavaScript to show off your work or products. You can add a slide show to your Web site even if you've never written a speck of JavaScript—just follow the step-by-step example in this article and use the actual scripts with minor modifications (you can download them from Macworld Online at www.macworld.com/1999/07/create/).

The example shows how to write a script that shows off your entire portfolio on your site (see "Create a JavaScript Slide Show"). With this script, you can let users view your images one at a time at their own pace. Once you set up the Web page with the new script, all the user has to do to see the slide show is simply to click on a button on the page.

I have also posted another step-by-step example on Macworld Online of a second JavaScript technique that can set your Web page apart from the pack. This technique lets you put a random image on a Web page. Every time a Web surfer loads the page, a JavaScript randomly displays one of the images from your portfolio. With this script and enough images in your portfolio, your page can look different every time the surfer sees it.



STUART BRADFORD

What Is JavaScript, Anyway?

A common—and confusing—misconception about JavaScript is that it's related to Java. In reality, there is no connection between these two programming languages. Netscape invented JavaScript (originally called LiveScript) as an add-on to Netscape Navigator 2. Netscape changed the name of LiveScript to JavaScript, probably hoping that some of the hype about Sun's Java programming language would rub off. The change did indeed attract attention, but it also permanently confused the relationship between Java and JavaScript. Here's the true story: these two languages have no relationship at all.

JavaScript is a scripting language that's much simpler to learn than Java. To put JavaScript effects on your Web pages, you

continues

WHAT YOU NEED

Text editor

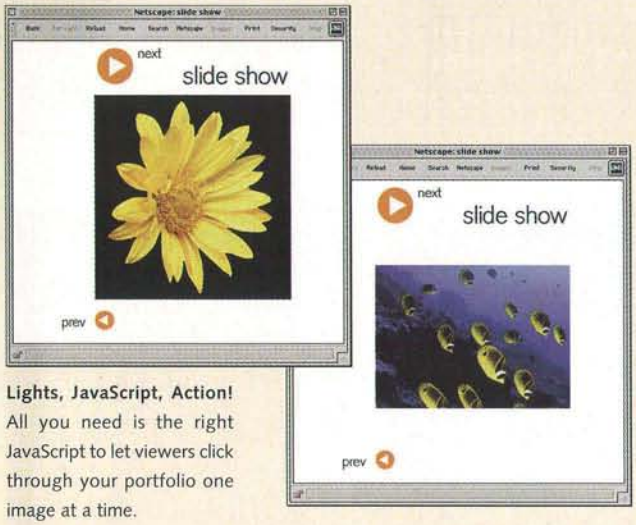
JavaScriptable browser

Netscape Navigator 3 or later

Microsoft Internet Explorer: Mac 3.1 or later, Windows 4 or later

CREATE A JAVASCRIPT SLIDE SHOW

SHOW OFF ARTWORK AT YOUR VISITORS' OWN PACE. ONCE you install this script, visitors simply click on a button to see every image in your portfolio one at a time. Even better, a viewer can choose to go forward or backward.



Lights, JavaScript, Action! All you need is the right JavaScript to let viewers click through your portfolio one image at a time.

Before you get started with the scripting, put all your images in order. Give consecutive names to the images that will go in your slide show. I use the naming scheme slide1.jpg, slide2.jpg, and so on. If you choose a different naming scheme, be sure to modify the script appropriately. I put the images in a folder called "images," which you should also do unless you prefer to make changes to the script.

All of your images must have exactly the same dimensions. If they don't, as in the images shown at the right (see "Get in Order"), you need to make the necessary adjustments—for example, changing the image size in Adobe Photoshop.

Before you begin, you should also create the graphics for the buttons users can click on to move forward and backward in your slide show. I label the buttons on my example Web page "next" and "prev." Put those files in the images folder as well.

Once you prepare your images, it's time to jump in and start writing the script. Each of the following steps explains how to do that. Some portions of the code that I describe are difficult to see in the sample script, so they are highlighted in bold text to make them easy to find.

1 Start the script by naming the image object (the part of the code that reserves a spot on your Web page for your slide-show images). In this case, it's called **slider**.

2 Here's where the JavaScript actually starts. Set the variable **imgCt** to the number of images you plan to use. In my example slide show, I have nine images (two of which appear at left). You also need to set up a second variable, **thisImg**, so that it keeps track of which image a visitor's browser is displaying. Since the Web page starts off by displaying the first image, set **thisImg** to **1**.

3 Next, build into your script the function **newSlide( )**, which lets users click on screen to see your slide-show images one by one. By using this function in conjunction with the **direction** parameter, you allow users to go forward and backward in the show. Here's where all the heavy lifting happens, so I'll explain in detail how to write this part of the code.

Start off by having the script check the user's browser for the object **document.images** to see whether the browser is JavaScriptable. Next, add the **direction** parameter to **thisImg**. In most cases this parameter tells the script which image to display. It does so by passing the value 1 to the script if a user clicks on the Next button, or –1 if the user clicks on the Prev button.

However, if users click on a button so many times that they

just add a little bit of code to your HTML inside a new tag: **<SCRIPT>** (see "The Slide Show Script" for an example).

One of the advantages to using JavaScript is that it lets you manipulate images. To understand how image manipulation works, let's look at the example of image rollovers. When you create a rollover, the HTML on your page starts off looking as it always has, with one change: the addition of a **NAME** attribute to the **IMG** tag. Giving a name to an *image object* (the part of a JavaScript that reserves a spot on your Web page for changing images) empowers JavaScript to manipulate images. An image object can display many different images, one at a time. For instance, your page can have two images, **homeOn.jpg** and **homeOff.jpg**, that are both associated with one image object called **home**. Which of the images the browser displays depends on whether the user's cursor is on or off the **home** image object. These two images, combined with a single image object, produce the rollover effect.

The JavaScript for creating a slide show also requires an image object—in "The Slide Show Script" it's called **slider**. Just as with the rollover effect, this image object displays multiple images—those in the slide show. Instead of rolling over a button to change images, the user clicks on a button on your page.

JavaScript Tools

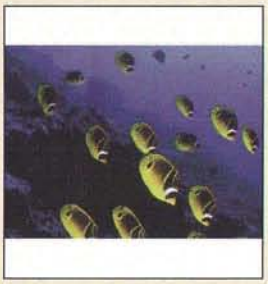
All you need to write JavaScript code is a text editor. Any old text editor will do. I use Bare Bones Software's BBEdit. But you can use Adobe GoLive 4, Macromedia Dreamweaver 2, or SoftPress Freeway 2 if you like. In fact, you can even use something as basic as Apple's SimpleText. And to test your JavaScript code, you just need a collection of browsers.

Not every browser lets users view JavaScript effects (see "What You Need" for a list of JavaScriptable browsers). Be sure to test your pages with a variety of old and new browsers and with JavaScript turned on and off. That way you won't exclude anyone from navigating your site, even if they can't see all your innovative techniques. ■

DORI SMITH is a coauthor of the upcoming *JavaScript for the World Wide Web: Visual QuickStart Guide*, third edition (Peachpit Press, 1999).

slide1.jpg

slide2.jpg



Get in Order To make your slide show work, give your images consecutive names and make adjustments so that all the images have the same dimensions.

pass the beginning or end of the slide show, the script needs to adjust the current image number so that the number isn't too high or low. The next few lines of code make the slide show start again at the other end. If **thisImg** is less than 1, the script resets it to the highest image number (**imgCt**). If **thisImg** is greater than the number of slides available, the script resets it to 1.

Now that the script has an image number that's within the proper range, it's time to reset the image. In order to do so, set **document.slider.src** to the location of the new image. Concatenating the parts of the image name, as I have done in my sample script, makes your script calculate the location on the fly.

4 To tell the **newSlide( )** function that users want to move forward when they click on the Next button, pass **newSlide( )** a parameter of **1**.

5 Similarly, pass the **newSlide( )** function a parameter of **–1** to tell the function that users want to view the previous image in the sequence when they click on the Prev button.

LEARN MORE ABOUT JAVASCRIPT

WEB SITES

The Joy of JavaScript
www.chalcedony.com/javascript/

JavaScript Developer Central
http://developer.netscape.com/tech/javascript/

ZDNet's DevHead JavaScript area
www.devhead.com/filters/javascript/

BOOKS

JavaScript for the World Wide Web: Visual QuickStart Guide, third edition (Peachpit Press, 1999), by Tom Negrino and Dori Smith

Designing with JavaScript (O'Reilly & Associates, 1997), by Nick Heinle

JavaScript Bible, third edition (IDG Books, 1998), by Danny Goodman

THE SLIDE SHOW SCRIPT

```
<HTML>
<HEAD>
   <TITLE>slide show</TITLE>
   <SCRIPT>
   <!— Hide script from older browsers

2     thisImg = 1
      imgCt = 9

3     function newSlide(direction) {
         if (document.images) {
            thisImg = thisImg + direction
            if (thisImg < 1) {
               thisImg = imgCt
            }
            if (thisImg > imgCt) {
               thisImg = 1
            }
            document.slider.src =
                "images/slide"
                + thisImg + ".jpg"
         }
      }
   // stop hiding script —>
   </SCRIPT>
</HEAD>
<BODY BGCOLOR=WHITE>
<CENTER>
   <TABLE BORDER=0 CELLPADDING=0
      CELLSPACING=0>
      <TR>
         <TD VALIGN=BOTTOM>
            <IMG HEIGHT=56 WIDTH=57
               SRC="images/prev.jpg">
         </TD>
         <TD>
4           <A HREF="javascript:newSlide(1)">
               <IMG HEIGHT=75 WIDTH=104
               SRC="images/nextbutton.jpg"
               ALIGN=LEFT BORDER=0></A>
            <IMG HEIGHT=70 WIDTH=170
               SRC="images/slideshowtext.jpg"
               ALIGN=RIGHT><BR CLEAR=ALL>
1           <IMG HEIGHT=314 WIDTH=300
               SRC="images/slide1.jpg"
               NAME="slider"><BR>
5           <A HREF="javascript:newSlide(-1)">
               <IMG HEIGHT=56 WIDTH=35
               SRC="images/prevbutton.jpg"
               BORDER=0></A>
         </TD>
      </TR>
   </TABLE>
</CENTER>
</BODY>
</HTML>
```

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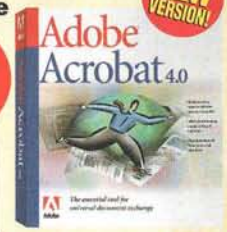

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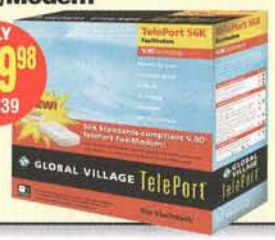

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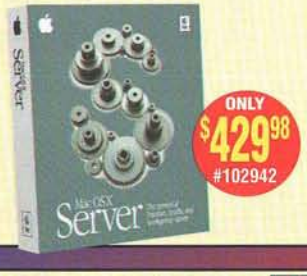

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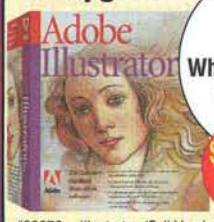

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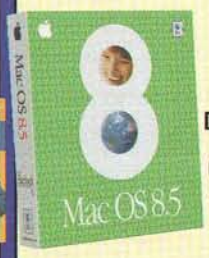

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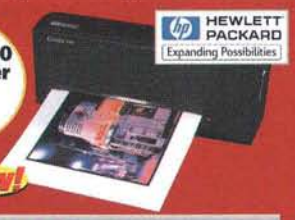

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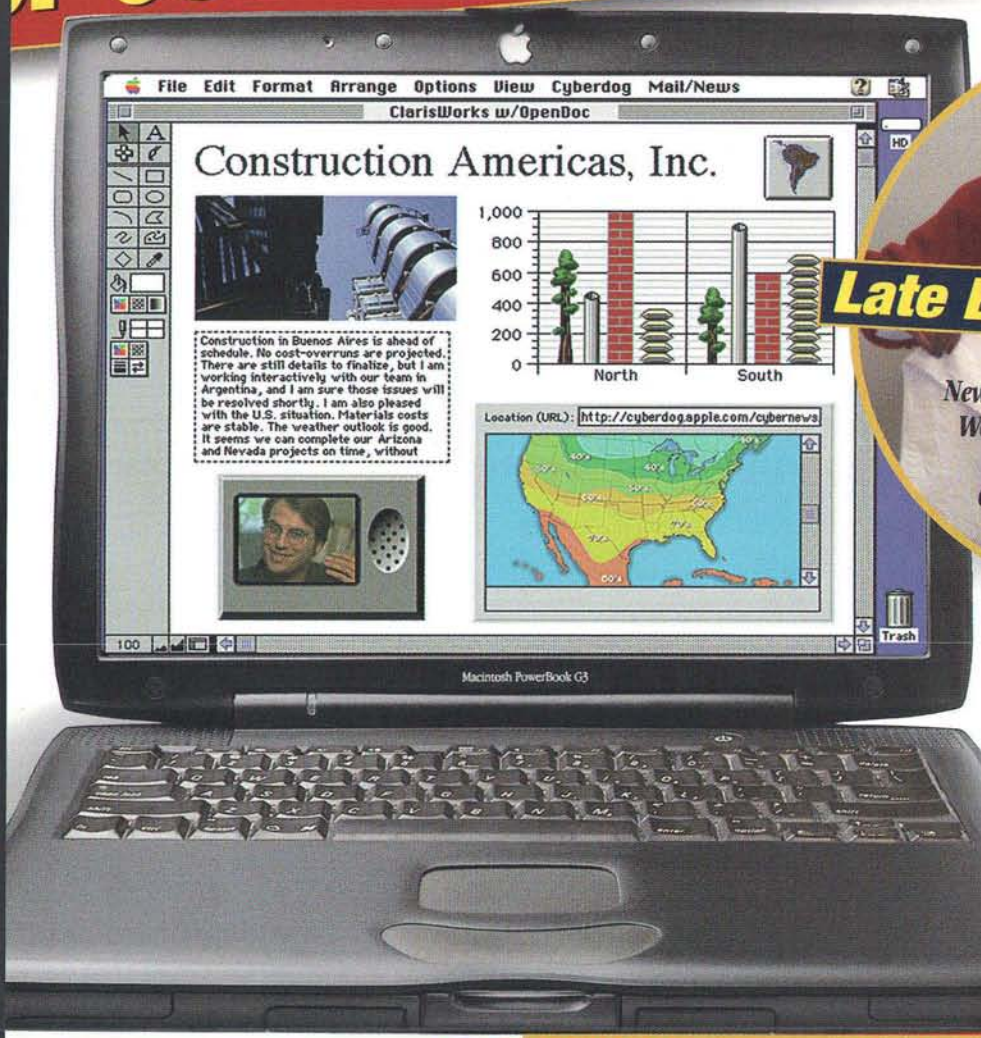

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#46091	Micromat Techtool Pro	$79.99	$15	❑
#46056	MacSoft Civilization II Multiplayer Gold Edition	$42.99	$5	❑
#46054	MacSoft Falcon 4.0	$42.99	$5	❑
#41092	Final Draft	$144.99	$85	❑
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#44226	HP DeskJet 895Cse Printer *$50 rebate with CPU and monitor purchase!*	$399.99	$50	❑
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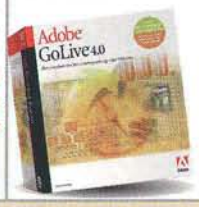

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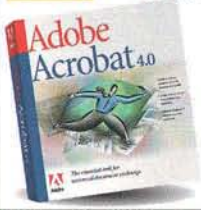

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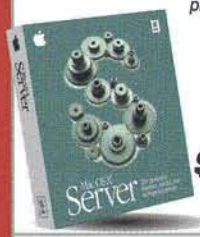

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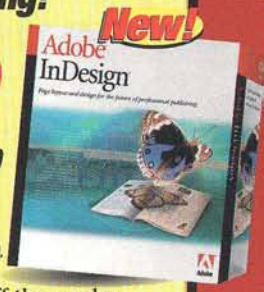

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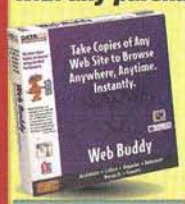

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**Buy any qualifying Power Mac G3 and receive a FREE Internal Iomega Zip Drive or FREE Apple 56K Internal Modem. Zip drive or modem will be sent to you directly from Apple. Allow 6-8 weeks for delivery. Good for purchases between 4/2/99 and 6/27/99. Visit warehouse.com/rebate/apple for coupon, or call us at 1-800-390-0706 to ask for one. Offer not valid on purchase of reconditioned models. Call for details.

3 PLUS, From Apple, Get a

$100 Rebate when you purchase a 17" Apple Studio Display and any qualifying Power Mac G3 together!††

††$100 manufacturer's mail-in rebate. Items must appear on same invoice. Offer expires 6/27/99. Visit warehouse.com/rebate/apple for coupon, or call us at 1-800-390-0706 to ask for one. Offer not valid on purchase of reconditioned models. Call for details.

NEW!

128MB PC100 SDRAM G3 Memory
For New Power Mac G3s with 100MHz bus speed.
Upgrade only $379.95! each
Item # CHP0691

Apple 56K‡ Internal Modem
Only $109.99!
56K modem with FaxSTF Software
Item # DMD4229

‡Capable of receiving at 56Kbps. Actual send and receive speeds may vary.

- Our sales staff is ready to take your order 24 hours a day, 7 days a week. We accept the following major credit cards: Visa, MasterCard, Discover Card/NOVUS, AmEx. Your credit card will not be charged until each item is shipped (no surcharge). CT, NJ and OH residents add applicable sales tax.
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- Orders for "in-stock" items placed on weekdays up until 12:00 midnight (E), 10:00 pm (E) for Internet orders, ship same day for overnight delivery (barring system failure, etc.). We anticipate being able to ship "out-of-stock" items within 30 days.
- All items we sell come with the MacWAREHOUSE 30-Day Guarantee Against Defects. Call our Customer Service Department at 1-800-925-6227 for a Return Merchandise Authorization (RMA) number within 30 days of the original invoice date. Defective software will be replaced immediately upon receipt of the defective product. Defective hardware will be replaced or repaired at our discretion, except for products from Apple 1-800-SOS-APPL (1-800-767-2775), or Tektronix (1-800-835-6100). These manufacturers must be contacted directly, and will repair or replace products at their sole discretion. Should you return hardware to MacWAREHOUSE from Apple or Tektronix, you will be assessed a 15% restocking fee which will be charged to your account. All returns are subject to the following: 1. All products must be returned in original packaging. 2. Shipping and handling charges are not refundable. 3. Software and consumables are not refundable unless returned unopened in original packaging with documentation. 4. Custom orders and cables are not refundable. 5. Products designated as "all sales final" are not refundable.

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All Power Mac G3s include:

- Up to a 400MHz PowerPC G3 processor
- Up to 1MB Backside Level 2 Cache
- ATI RAGE 128 graphics card with 16MB of graphics memory
- Up to 12.0GB hard drive
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- 24X max. CD-ROM drive or DVD-ROM drive (on model CPU1283/CPU1333)
- 10/100Base-T Ethernet
- Two FireWire ports
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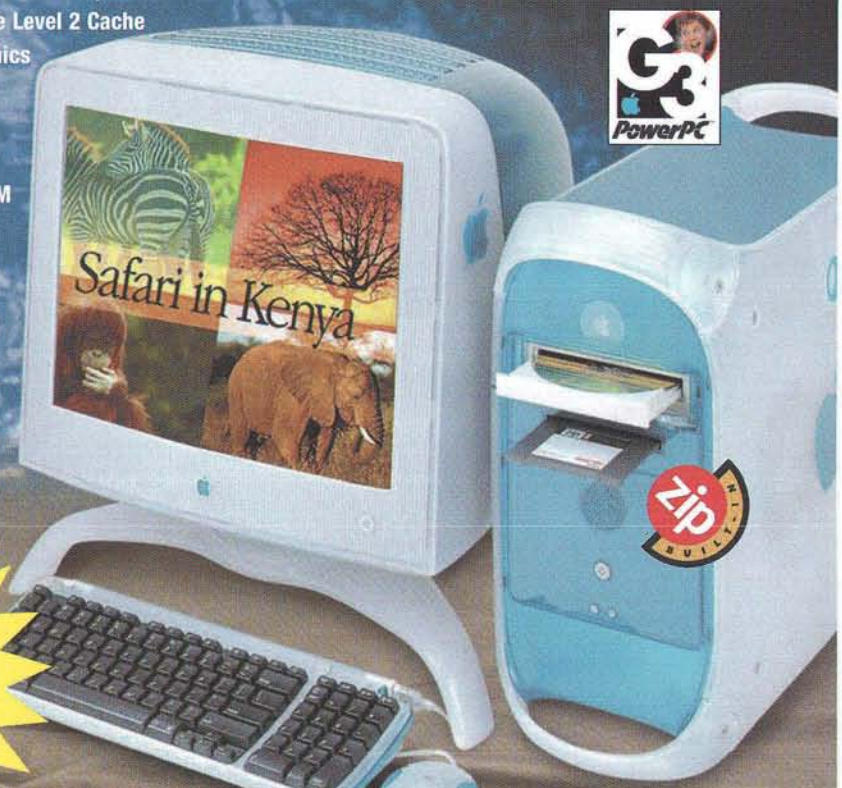

Apple 17" Studio Display Only $499! Item # MON0786

Monitor sold separately. Model shown is CPU1284.

		Regular MacWAREHOUSE Price	Price with Free* 64MB RAM
300MHz PowerPC G3/ 64MB SDRAM/6.0GB HD/24X max. CD-ROM drive/512K Backside Level 2 Cache	LeaseIt! for as low as $56/mo.[5]	$1599 Item # CPU1282	$1628.95 Item # CPU1332
350MHz PowerPC G3/64MB SDRAM/6.0GB HD/ DVD-ROM drive/1MB Backside Level 2 Cache	LeaseIt! for as low as $69/mo.[5]	$1999 Item # CPU1283	$2028.95 Item # CPU1333
350MHz PowerPC G3/128MB SDRAM/12.0GB HD/24X max. CD-ROM drive/Zip Drive/1MB Backside Level 2 Cache	LeaseIt! for as low as $87/mo.[5]	$2499 Item # CPU1284	$2528.95 Item # CPU1334
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*$29.95 installation fee required.

Agfa SnapScan 1212U Scanner

AGFA

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- 36-bit
- Translucent Blue
- 600 x 1200 dpi
- 8.5" x 11.7"

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Mactell PowerJolt G3 Upgrade Card

Only $249.95! DRI2818

- 266MHz
- 512K cache running @133MHz

mactell

Epson Stylus Color 900 Printer

10ppm Color!

Only $449.95! PR14811

- 12ppm black; 10ppm color
- 1440 x 720 dpi
- Smallest ink droplets
- Optional networking

EPSON

Nikon CoolPix 950 Digital Camera

New!

Only $949.95! IN7755

- 2" color LCD • 3X optical zoom
- 2.11 million pixel resolution
- 8MB compact flash stores up to 128 standard images

Nikon

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New!

Only $299.95! External Drive: DRI3342

- CD-RW 4x2x8 for Mac

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- Fully integrated with Mac OS 8 and OS 8.5
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iMac Add-on!

Includes:
- Translucent blue Zip drive
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- Carrying case
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NEW! HP DeskJet 882c Color Printer

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USB compatible

- USB compatible only
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iMac USB Hubs

As low as $59.99! DEH4075

entrega.

- Provides 4 to 7 additional USB ports for expanding your peripherals.
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USB compatible

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- 600 x 1200 dpi resolution
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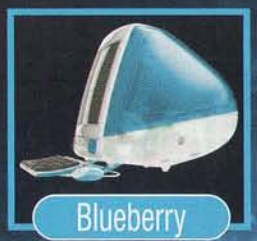
NEW LOW PRICE!

iMac/333MHz– Available in all 5 colors! Still only $1199! each



Blueberry CPU1336

Grape CPU1337

Lime CPU1338

Strawberry CPU1339

Tangerine CPU1340

- 333MHz PowerPC G3 Processor
- Built-in 15" Color Monitor (viewable size: 13.8")
- 32MB (256MB max.)
- 6.0GB hard drive
- 512K Backside Level 2 Cache
- 6MB of Video RAM
- Built-in 24X CD-ROM drive
- Built-in 56Kbps Modem
- Built-in 10/100Base-T Ethernet
- Mac OS 8.5

Adds Serial and Parallel ports to your iMac!

iDock, from CompuCable, expands iMac's connectivity. iDock is a swivel base with an Integrated 3-port USB Hub plus 2 Apple Serial/Geo Ports and 1 Parallel Port. With iDock, iMac can be connected to native Mac serial devices and multi-platform parallel devices. iDock is molded to match iMac perfectly. $199.99

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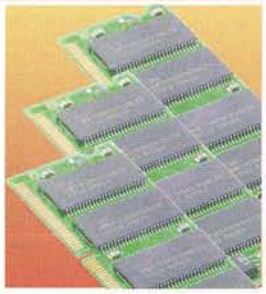
32MB SDRAM

Only $99.95! each

Item # CHP0658

- 66MHZ
- 144 PIN SODIMM



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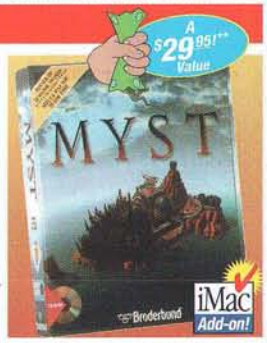

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ORBIT USB FOR MAC

$15 MAIL-IN REBATE!

As low as $34.95!* with iMac or USB Power Mac G3 purchase

Ask for item # AAP0600.

USB compatible iMac Add-on!

- Designed specifically for use with USB
- Fits the natural shape of your hand

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- 1200 dpi
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- Mac LocalTalk connectivity

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333MHz iMac!

Only $27.45 a month†

Brand new 333MHz iMac blows the doors off anything else on the information superhighway!

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Leaseit! for only $42/mo.‡

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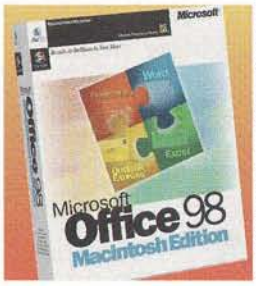

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Price: **$279.95**
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- Comes in Blueberry or can be customized to match your iMac flavor
- 1440 x 720 dpiw/smaller ink drops
- 6ppm black; 5ppm color
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- 120MB capacity
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Farallon

Only **$109.99!**
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- Auto negotiation

10/100 PCI Adapter 5-pack (Mac/PC): Item # DEC3344, only $239.99.

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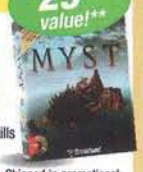

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DIAMOND MULTIMEDIA COMMUNICATIONS DIVISION

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- Serial interface

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- 133MHz RISC processor

HP LASERJET 2100M
- Prints 10ppm
- 1200 dpi resolution
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- LocalTalk connectivity

HP LaserJet 2100M $795.95! Item # PR14691 LeaseIt! for $28/mo.[3]

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- 1200 dpi maximum resolution
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Optiquest — OPTIMIZE YOUR IMAGE

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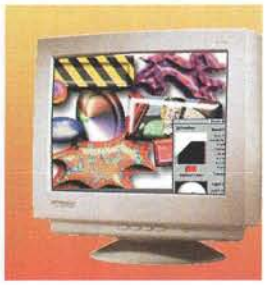

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jaz drive 1GB

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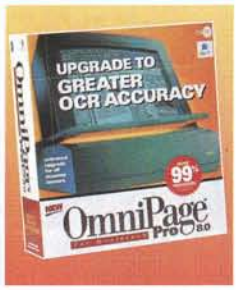

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IMATION

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3Com U.S. Robotics V.90 56K* FaxModem

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$20 Rebate!

- Manufacturer's lifetime warranty

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- Up to 6.0GB hard drive
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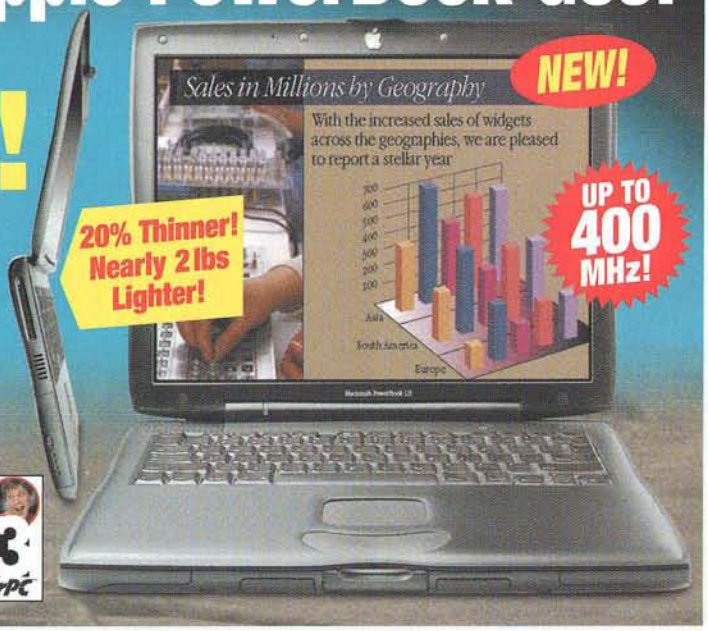
- 56K V.90 modem
- 10/100 Base-T Ethernet
- Up to 1MB Backside Level 2 Cache
- 14.1" Active-Matrix Color Display
- 2 USB ports
- 8MB Video Memory



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G3 PowerPC

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- 512K Backside Level 2 Cache
- 14.1" Active-Matrix Color Display
- 2 USB ports • 8MB Video Memory

Only **$2499!**

Item # CPU1359
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- DVD-ROM drive • 56K V.90 modem
- 10/100Base-T Ethernet
- 1MB Backside Level 2 Cache
- 14.1" Active-Matrix Color Display
- 2 USB ports • 8MB Video Memory

Only **$3499!**

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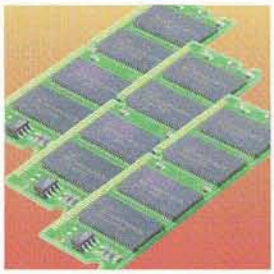
Upgrading your memory is the most cost-effective way to increase the performance of your system!

PowerBook Memory only $99.95! each

Item # CHP9820



APPLE POWERBOOK G3/233MHZ

- 233MHz PowerPC G3 processor
- 32MB SDRAM • 2.0GB hard drive
- 20X CD-ROM drive • 56K modem
- 10Base-T Ethernet
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Item # CPU1238
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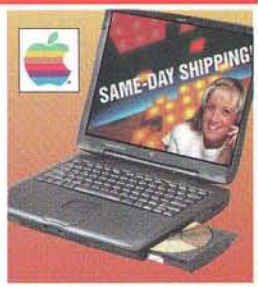

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- Bootable (Mac OS 8 boot disk provided)

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- DVD-ROM drive reads CD-ROM discs up to 12X, DVD at up to 1.5X
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PowerBook sold separately.

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G3 PowerPC

Apple 333MHz iMacs: 5 colors to choose from!

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Blueberry, shown.

- 333MHz PowerPC G3 processor
- 32MB SDRAM (256MB max.)
- 6.0GB hard drive
- 24X CD
- 56K modem
- 15" color monitor

Blueberry: Item # RCPU1336
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only $1399!* Ask for item # RCPU1282.

- 300MHz PowerPC G3 processor
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- 20X CD • 56Kbps modem
- 14.1" Active matrix color display

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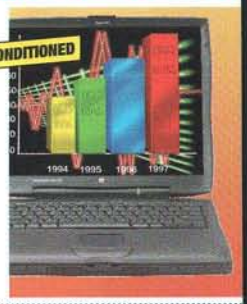

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HITACHI

- 17" monitor (15.9" viewable)
- Resolutions up to 1152 x 870 @ 75Hz
- .28mm dot pitch
- Manufacturer's 3-year warranty

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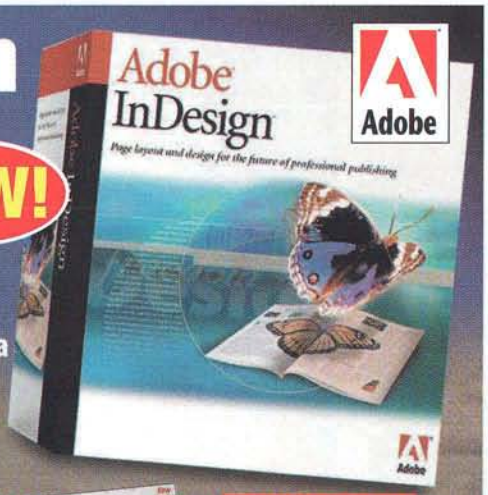

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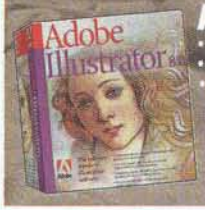

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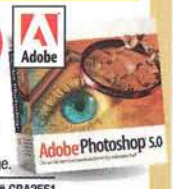

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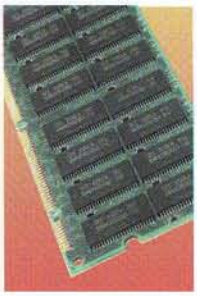

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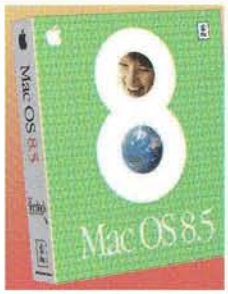

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- Budget-conscious 7200 rpm Medalist Pro mechanism for desktop/workstation
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- Blazing transfer speeds of up to 400mb/sec.

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- 7200 rpm 9GB for departmental and enterprise servers
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APS Q 2GB	Quantum Fireball SE, 2079MB, 5400 rpm	$199.95	$209.95	$269.95
APS Q 3GB	Quantum Fireball SE, 3079MB, 5400 rpm	219.95	229.95	289.95
APS ST 4GB	Seagate Medalist Pro, 4520MB, 7200 rpm	229.95	239.95	299.95
APS ST 9GB	Seagate Medalist Pro, 9140MB, 7200 rpm	379.95	389.95	449.95
APS I 18GB	IBM Ultrastar, 17501MB, 7200 rpm	749.95	759.95	819.95

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- 7200 rpm drives with LVD SCSI
- 18GB capacity for corporate servers

These 7200 rpm mechanisms provide corporate-size storage and high-performance for servers. With internal data transfer rates of up to 17MB/s and an LVD SCSI interface, the Barracudas race through data-intensive projects like multimedia and imaging. Low seek times make these drives suitable for OLTP servers, too.

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- Among the first hard drives with USB
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- Blazingly fast hard drive for high-end servers, including digital video
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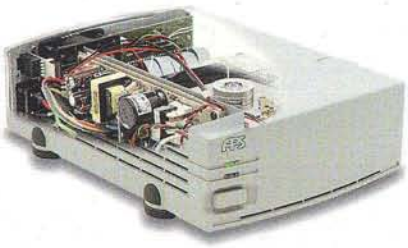

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APS ST 9GB LVD	Seagate Barracuda, 8683MB, 7200 rpm	449[95]	519[95]
APS I 9.1GB LVD	IBM Ultrastar 9LZX, 8705MB, 10,000 rpm	549[95]	619[95]
APS Q 9GB 10K LVD	Quantum Atlas 10K, Ultra 160/m, 10,000 rpm	599[95]	669[95]
APS ST 9.1GB LVD	Seagate Cheetah III, 8694MB, 10,000 rpm	549[95]	619[95]
APS I 18GB LVD	IBM Ultrastar 18XP, 17501MB, 7200 rpm	749[95]	819[95]
APS Q 18GB LVD	Quantum Atlas IV, Ultra 160/m, 7200 rpm	749[95]	819[95]
APS ST 18GB LVD	Seagate Barracuda, 17366MB, 7200 rpm	749[95]	819[95]
APS Q 18GB 10K LVD	Quantum Atlas 10K, Ultra 160/m, 10,000 rpm	999[95]	1,069[95]
APS ST 18.1GB LVD	Seagate Cheetah III, 17366MB, 10,000 rpm	969[95]	1,039[95]
APS I 36GB LVD	IBM Ultrastar, 35140MB, 7200 rpm	1,399[95]	1,469[95]
APS Q 36GB LVD	Quantum Atlas IV, Ultra 160/m, 7200 rpm	1,399[95]	1,469[95]
APS Q 36GB 10K LVD	Quantum Atlas 10K, Ultra 160/m, 10,000 rpm	1,559[95]	1,629[95]
APS ST 36GB LVD	Seagate Barracuda, 36.1MB, 7200 rpm	1,399[95]	1,469[95]
APS ST 36GB LVD	Seagate Cheetah III, 36.1MB, 10.000 rpm	1,599[95]	1,669[95]
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- Faster reader and 4x8 CD-R dupes full CDs in just 18 minutes for better production

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External Configuration

APS DVD-ROM

- World's first 6X DVD mechanism also acts as 32X CD-ROM drive
- Reads audio, multimedia and gaming CDs - even CD-R and RW

This optical marvel, based on the world's first 6X DVD mechanism, reads virtually every type of DVD and CD disc around at top speed. With the Wired 4DVD PCI card, you can even watch Hollywood DVD movies right on your computer screen or your TV. 6X maximum speed gives you smoother playback of movies and games than earlier generation DVD drives.

$399.95
External Configuration

APS CD-R 8x20

- Super-speedy CD burner for creative professionals
- 8X record/20X read mechanism
- Includes full-featured CD recording software for Mac and PC

Hit the afterburner! The CD-R 8x20 is our fastest CD recorder ever. The blazing 8x20 mechanism cranks out your CDs in just nine minutes, so you spend less time burning, more time creating. If your payday depends on producing CDs, punch in with the APS CD-R 8x20.

Top CD burner only $399.95
External Configuration

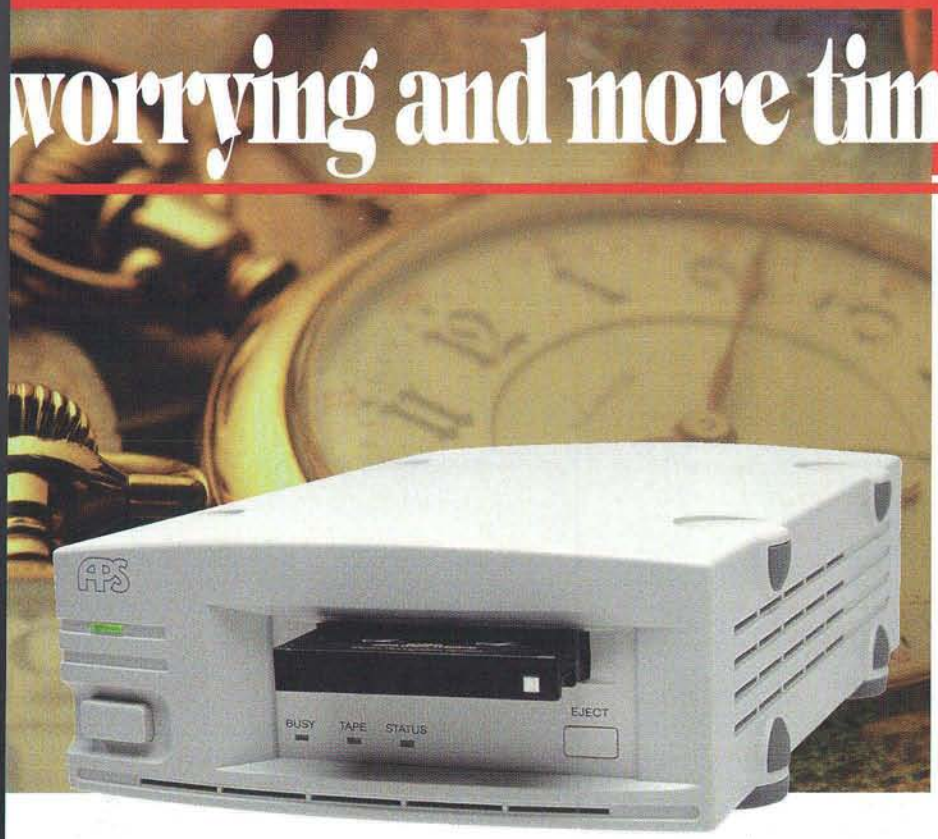
APS DVD-RAM

- Special offer on top technology exclusively for *Macworld* readers
- Up to 5.2GB capacity on double-sided discs
- 1MB cache buffer
- Reads all previous CD and DVD formats, including CD-R and CD-RW media

This spectacular new storage technology is expected to become the new worldwide standard.

Macworld Exclusive $599.95
External Configuration

worrying and more time creating.



APS HyperDAT® III

- 12GB native backup for high-end workstations, entry-level networks
- Reliable DDS-3 technology

The APS HyperDAT III provides a cost-effective solution to the backup needs of data-intensive systems. Transfer rates of up to 60MB/s for fast backups

w/ NovaBack $979.95
External Configuration

APS AIT Plus

- Safeguards up to 35GB native on AIT Plus tape
- Super-fast backup speeds for mid-range and application server backup, even DV storage

If you thought DLT was your only choice for mammoth backups, think again. The new AIT Plus challenges the DLT70 in both capacity and transfer speeds. Self-cleaning features and low cost of ownership.

w/ Retrospect $1,999.95
External Configuration

APS DLT70

- Super-fast, reliable, high-capacity backup
- Worldwide leader in server, network and enterprise backup
- Protects up to 35GB of business-critical data at up to 300MB/second

The APS DLT70 gives you network administrators and IT managers the absolute protection you need. And it squeezes backups into the shrinking windows you have. Quit putting up with slow, unreliable backups. Upgrade to the APS DLT70 today.

Peace of mind only $3,999.95
External configuration

APS NS-8

- Protects up to 4GB of critical data (native)
- "...the best back-up solution available for the home and small offices." – Brad Miser, **Using Mac OS 8.5**

The APS NS-8 (the drive formerly known as the APS HyperQIC) is now better than ever. This Travan NS-8/QIC drive now has hardware ALDC compression for faster backups and more efficient data storage. You can safeguard up to 8GB of valuable business or personal files on one tape with the new compression. The APS NS-8 is recommended as the best backup solution for home and small offices in **Using Mac OS 8.5** by Brad Miser. The NS-8 is just as good for Windows users, too.

w/ NovaBack $349.95
External Configuration

APS HyperDAT® IV

- Longer tape, higher density vault DDS-4 into network backup capability
- 20GB native capacity, 2-3MB/s transfers

If you trust your desktop and workstation backup to DDS, but it doesn't meet your server or workgroup needs, take a second look. New DDS-4 technology has increased capacity by 67% over DDS-3 and shrunk your backup time in half. But the HyperDAT IV can read and write to your DDS-3 and even DDS-2 tapes, so migration is painless. Why not add the HyperDAT IV for your big jobs?

w/ NovaBack $1,349.95
w/ Retrospect $1,399.95
External Configuration

APS HyperDAT® II

- Backup and restore speeds as high as 46MB per minute
- Up to 4GB of storage per 120m DAT/DDS-2 tape cartridge

The APS HyperDAT II is perfect for desktop backups. With standard 120m DDS-2 tapes the APS HyperDAT II can backup up to 4GB of data. The HyperDAT II can also use economical 60m and 90m tapes. Ships with backup software and includes a two-year warranty.

Desktop backup just $599.95
External Configuration

Drives on these pages are covered by the APS 30-Day Money-Back Guarantee.

APS TAPE BACKUP SYSTEMS

Model	Description	External
APS NS-8	Travan-4/NS8/QIC	$349.95
APS NS-20	Travan-5/NS20/QIC	549.95
APS HyperDAT®II	DDS-2/DAT (4-8GB)	599.95
APS HyperDAT®III	DDS-3/DAT (12-24GB)	979.95
APS HyperDAT®IV	DDS-4/DAT (20-40GB)	1,349.95
APS DDS-2 Autoloader	4mm DDS-2 AutoLoader (96-192GB)	2,399.95
APS DDS-3 Autoloader	4mm DDS-3 AutoLoader (96-192GB)	3,199.95
APS DLT40	DLT 4000 (20-40GB)	1,999.95
APS DLT70	DLT 7000 (35-70GB)	3,999.95
APS AIT Plus	8mm Advanced Intelligent Tape (35-70GB)	1,999.95
APS AIT Autoloader	8mm AIT, 200GB on 4 tapes	4,799.95

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MVC-FD91

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Sony CPJ-D500 Portable Projector

- Lightweight projector for heavyweight presentations
- 8.3lbs. and sets up in seconds

The CJP-D500 helps you hit your audience right between the eyes, but takes it easy on your back. Fully VGA-compatible, the CPJ-D500 gives you 24-bit color output at 640 x 480 resolution from a bright, long-lasting 80-watt metal halide bulb. Includes an RCA video input jack, microphone input jacks and stereo headphone output jack to drive external speakers. Accepts PC, Macintosh, NTSC and PAL input. Includes RGB and power cables, presentation software and carrying case.

SONY CPJ-D500 PROJECTOR $1,879.95

EPSON Stylus Color 900 Printer

- Print professional-looking documents for home or small business
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- Faster color printing (up to 10 ppm) makes you more productive

Stylus Color 900

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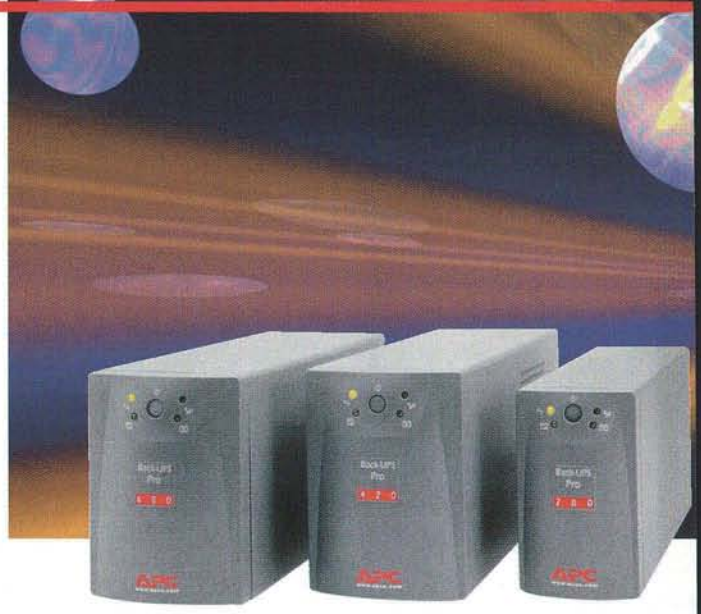
EPSON STYLUS COLOR 900 PRINTER $429.95



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108357	BP650S	650	410	35-40 MIN	3	3	6.6 X 4.7 X 14.5	269.95
108717	BP1000	1000	670	10-15 MIN*	6	N/A	8.5 X 6.7 X 17.3	369.95
108714	BP1400	1400	950	15-20 MIN*	6	N/A	8.5 X 6.7 X 17.3	459.95

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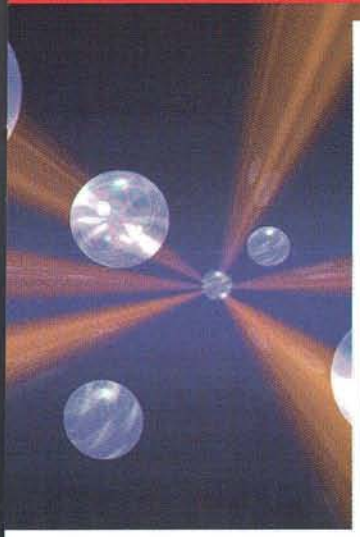

Sony Multiscan 400PS Display

- 19" display for demanding design and imaging professionals
- 40-50% flatter CRT and higher scan rates for superior viewing

This Trinitron monitor offers the larger screen sizes you need to see your project all at once, plus the technology to make it really pop off the screen. The compact design takes up minimal desk space. Digital Multiscan technology allows you to switch among graphics modes effortlessly. Higher scan rates, dual inputs and user-adjustable color temperature settings make these the most flexible and customizable displays on the market. You demand the best from yourself. Now you can demand the best in computer displays and get the Sony Multiscan 400PS.

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- Sharp 1024 x 768 at 85Hz reduces eyestrain
- Perfect for cramped studios and content creation cubicles

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SONY MULTISCAN CPD-L150 $1,249.95

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- Amazing tablets act as monitors – you draw and design directly on screen and work more intuitively
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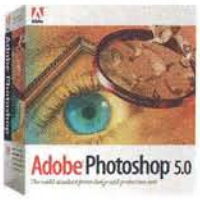

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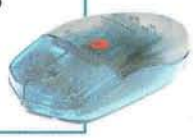

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4x2x20 Plextor mechanism, tray load, 2MB buffer	$379	$439
8x2x20 Sanyo mechanism, tray load, 2MB buffer	$439	$499

USB PRODUCTS

4x2x8 CD Rewritable (USB4X2X8)	$call
100MB Zip (ZIP100USB)	$145
USB to SCSI adapter (USBSCSI)	$89
SuperDisk drive, 120MB & floppy (USBLS120)	$149
Floppy Drive (USBFLOPPY)	$99
8GB Hard Drive (USB8GB)	$229
12GB Hard Drive (USB12GB)	$309
16GB Hard Drive (USB16GB)	$379
USB Case for IDE hard drive (USBCASE)	$99

G3 UPGRADES

Upgrades for the new G3 Mini Tower Macintosh computers.

Adaptec PCI SCSI card (A2906E)	$65
20GB Hard Drive (M92048D)	$365

HOT SELLERS

YAMAHA 4x4x16 CD-RW Drive

Drive with Toast, Direct CD, 1 Free CD-RW disk

Internal (YCRW4416M)	$275
External (YCRW4416MX)	$335

DVD RAM

Toshiba SCSI DVD RAM drive (SDW1101)	$459
Panasonic SCSI DVD RAM drive (LFD101U)	$569
Mac DVD RAM driver software (MDVDSFT)	$59
DVD RAM media (DVDRAMDISK)	$35
Fargo InkJet CD Color Printer (CDPRINTER)	$999
Adaptec Ultra Wide PCI controller (A2940MUW)	$259
Adaptec Ultra-2 PCI controller (A2940MU2W)	$359
Toshiba SCSI 5X DVD ROM (SDM1201)	$169
Cedar CD Duplicator (CEDARDUP50)	$4999

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18.2GB	7200	1MB	XP318200S	$659
ULTRA WIDE SCSI				
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9.1GB	7200	512K	VK309100W	$339
ULTRA-2 SCSI *(ask about rebate)*				
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9.1GB	7200	512K	VK309100LW	$339
9.1GB	7200	1MB	XP309100LW	$359
18.2GB	7200	1MB	XP318200LW	$659
ULTRA 160/m SCSI New SCSI interface will transfer 160MB/sec on new controllers. Drives will work on older SCSI, Ultra Wide, Ultra-2 controllers.				
9.1GB	7200	2MB	KN309100LW	$389
9.1GB	10,000	2MB	TN309100LW	call
18.2GB	7200	2MB	KN318200LW	$729
18.2GB	10,000	2MB	TN318200LW	call
36.4GB	7200	2MB	KN336400LW	$1319
ULTRA-2 SCSI A/V (Min sustained 10MB/sec)				
4.5GB	7200	512K	VK304550LV4	$269
9.1GB	7200	512K	VK309100LV4	$369
18.2GB	7200	1MB	XP318200LV4	$689
IDE *(ask about rebate)*				
4.3GB	5400	512K	CR304300A	$120
6.4GB	5400	512K	CR306400A	$145
6.4GB	7200	512K	KA306400A	$149
8.4GB	5400	512K	CR308400A	$150
9.1GB	7200	512K	KA309100A	$210
12.7GB	5400	512K	CR313000A	$205
13.6GB	7200	512K	KA313600A	$300
18.2GB	7200	512K	KA318200A	$399

IBM

ULTRA SCSI				
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9.1GB	7200	512K	IBM39130N	$325
18.2GB	7200	1MB	IDGHS18Z	$719
18.2GB	1" High	2MB	IBM318350N	$775
ULTRA WIDE SCSI				
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9.1GB	7200	512K	IBM39130W	$325
18.2GB	1" High	2MB	IBM318350W	$775
ULTRA-2 SCSI				
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9.1GB	10020	4MB	IDRVS9UZ4	$549
18.2GB	7200	1MB	IDGHS18U2	$719
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18.2GB	1" High	2MB	IBM318350U2	$775
36.4GB	7200	4MB	IDRHS36U2	$1329
IDE				
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10.1GB	7200	512K	IBM10GXP	$225
14.4GB	7200	512K	IBM14GXP	$295
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9.1GB	7200	512K	ST39140N	$309
9.1GB	7200	1MB	ST39173N	$375
18.2GB	7200	1MB	ST118273N	$689
ULTRA WIDE SCSI				
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4.5GB	7200	512K	ST34573W	$315
6.5GB	7200	512K	ST36530W	$259
9.1GB	7200	512K	ST39140W	$309
9.1GB	7200	1MB	ST39173W	$375
18.2GB	7200	1MB	ST118273W	$689
ULTRA-2 SCSI				
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4.5GB	10,000	1MB	ST34502LW	$419
9.1GB	10,000	1MB	ST39103LW	$539
9.1GB	10,000	4MB	ST39102LW4	$589
9.1GB	7200	1MB	ST39175LW	$375
18.2GB	7200	1MB	ST118273LW	$689
18.2GB	7200	1MB	ST318275LW	$759
18.2GB	10,000	1MB	ST118202LW	$909
18.2GB	10,000	1MB	ST318203LW	$929
18.2GB	10,000	4MB	ST118202LW4	$1049
36.4GB	7200	1MB	ST136475LW	$1419
36.4GB	10,000	1MB	ST136403LW	call
50.1GB	7200	1MB	ST150176LW	call
IDE				
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8.6GB	5400	512K	ST38420A	$140
10.2GB	5400	512K	ST310230A	$164

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9.1GB	7200	2MB	WDAC29100	$215
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13.0GB	5400	512K	WDAC313000	$205
18.0GB	7200	2MB	WDAC418000	$315
25.0GB	5400	2MB	WDAC420400	$300

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13.0GB	5400	512K	M91303D	$200
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6.4GB	8.45mm	Toshiba	MK6412MAT	$239
10GB	12.5mm	Toshiba	MK1011GAV	$459
6.4GB	9.5mm	IBM	DB206480	$259
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10GB	12.5mm	IBM	DC210000	$459
14.1GB	17mm	IBM	DC214000	$599

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6GB	52MB/min	Indigita IDT2500	**$489**
12-24GB	144MB/min	Sony DDS-3 SDT9000AI	$759
12-24GB	132MB/min	Seagate STD224000N	$849
12-24GB	120MB/min	HP DDS-3 C1554AI	$929
20-40GB	288MB/min	Sony DDS-4 SDT10000AI	$1129
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7-14GB	120MB/min	ELIANT820	$1279
20-40GB	360MB/min	EXB8900	$2489
70-140GB	60MB/min	EXB10H 10 tape loader	$2699
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35-70GB	600MB/min	DLT7000	$4579

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2GB Jaz External SCSI	$319
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2.6GB SCSI drive	$1089
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Plextor	PX32TS(tray)	32X	85ms	$119
Plextor	PX32CS(caddy)	32X	85ms	$159
Pioneer	DRU766S	36X	70ms	$85
Pioneer	DRU966S	40X	70ms	$89
Toshiba	XM6401B	40X	79ms	$95
Plextor	PX40TS	40X	85ms	$139
• WIDE SCSI •				
Plextor	PX40TSUW	40X	85ms	$169
• IDE •				
Pioneer	DRU944	40X	70ms	$64
NEC	CDR3000	40X	75ms	$65
Memorex	CD48X	48X	90ms	$72
Kenwood	UCR412	52X	90ms	$121

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2.3Gig, 5.25", 512K	$30	$26	$24
2.6Gig,5.25", 1024K	$33	$29	$27
5.2Gig, 5.25", 2048K	$70	$68	$64

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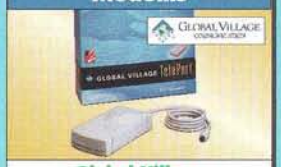

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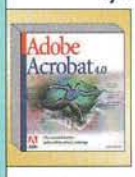

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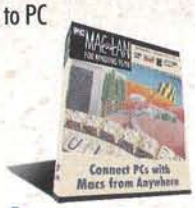

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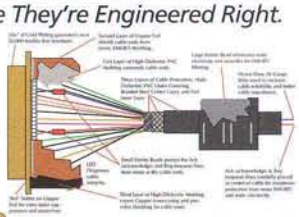

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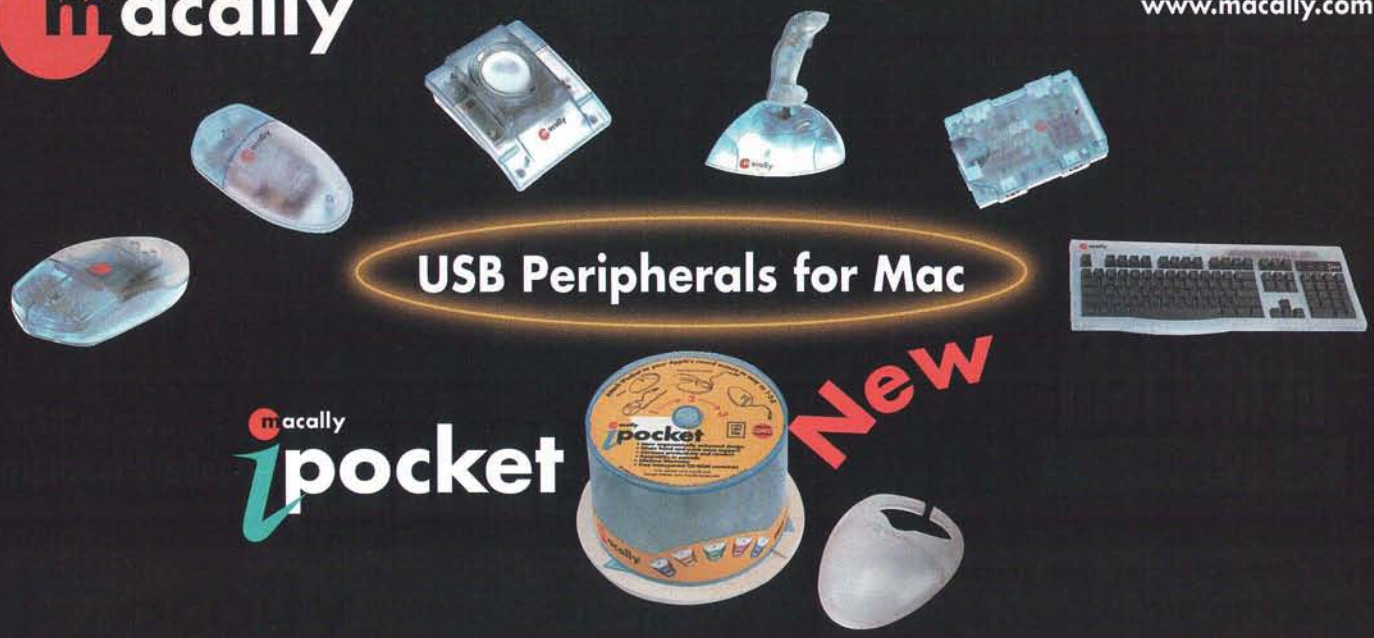

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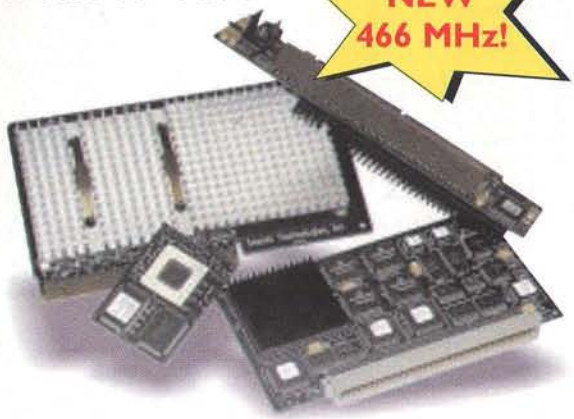

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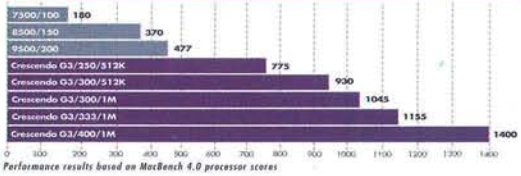

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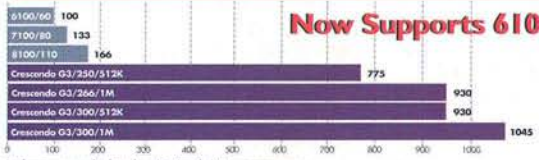

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by David Pogue

The Dark Side of the Dark Side

IS MICROSOFT THE GREAT SATAN? YOU MIGHT BE SURPRISED.

MAC FANS ALWAYS joke that Microsoft is the Evil Empire. We call Windows the Dark Side. We make fun of Bill Gates's schemes to take over the world. But I thought we were kidding. Since the government has started taking a closer look, however, a clearer picture of Microsoft's soul has emerged, and it's disturbing. The following embarrassments are just the tip of the iceberg.

The Phony Grassroots Campaign

In 1998, as 12 states were preparing antitrust suits against Microsoft, the *Los Angeles Times* unearthed a brazen Microsoft plot to sway public opinion. Microsoft hired PR companies in those 12 states to flood newspapers and the offices of attorneys general with editorials and letters. These letters, bearing ordinary individuals' names but actually written by Microsoft PR staff, were intended to show "grassroots" support for Microsoft; payments were funneled through Microsoft's main PR company so that the checks couldn't be traced.

According to *Brill's Content* magazine, Microsoft's media-manipulation attempts don't stop there. Key journalists are courted, given meals and personal invitations to Bill Gates's new mansion; negative reviewers are harangued and bad-mouthed. ("We really believed in this influencer model," says a former Microsoft VP. "The trade press [was] worked from every stage.") Microsoft even hires phony consumers to spread warm fuzzies online—*Brill's Content* describes the ardently pro-Microsoft cybernaut named "Steve Barkto," who claimed to be a technology officer from Oklahoma. How odd, therefore, that he paid for his CompuServe account with a Microsoft credit card!

All of this helps explain why Microsoft has enjoyed such fawning coverage in the mainstream media, whereas every Apple hangnail is a cue for "Apple Dying" articles.

The Phony Videotapes

Midway through its antitrust trial, Microsoft attempted to prove the inseparability of Windows and Internet Explorer by showing the judge a video. Fine—except that the government's lawyer noticed that as the tape rolled on, the number of icons on the desktop kept changing. Microsoft sheepishly admitted to splicing footage from different computers to make its point.

The Phony Amnesia

During Bill Clinton's grand jury testimony, his greatest line was: "That depends on what you mean by 'is.'" But in his own taped testimony, Bill G. makes Bill C. look like an amateur, pretending not to know the meaning of words like *market share* and *we*, and denying that he wrote e-mails bearing his signature.

Throughout the trial, in fact, Microsoft reps had enough mental lapses to qualify for disability—and silly excuses to explain them. When Microsoft VP Brad Chase claimed that Internet Explorer gained popularity because it's so *good*, a government lawyer showed him a 20-page Microsoft survey. Its conclusion: most people choose Internet Explorer because "it came with my computer." Chase's dubious response: an intern who had no standing at Microsoft created the document.

The Secret Data Collection

At www.macintouch.com, you'll find reams of data about the security holes in Microsoft Office. A Word document may invisibly store your name, e-mail, URLs, folder names, and more. This data goes along for the ride when, for example, you e-mail your work to others. (A fix is available at www.microsoft.com/mac.) On Windows, the company even tracks exactly what kind of PC gear you have. The *New York Times* reported that Microsoft Office documents contain a "globally unique identifier" that "can be used to trace files back to a specific person"—indeed, that's how investigators tracked down the author of the Melissa virus.

The Upshot

This stuff is real. Suddenly, the jokes about Microsoft's evil ways aren't so funny any more.

Two years ago, I asked a *Wall Street Journal* reporter why newspapers give Apple such a hard time. He told me that coverage goes in cycles; Apple was a media darling for ten years during the early Steve Jobs era. Now, he said, it was Apple's turn in the doghouse, and Microsoft's in the spotlight. "Don't worry," he concluded. "The pendulum always swings back." The funny thing is, those same reporters unearthed every example of Microsoft conspiracy and media manipulation described here. Look out, Bill—the pendulum is swinging. m

DAVID POGUE (www.davidpogue.com) is the author of *PalmPilot: The Ultimate Guide*, second edition (O'Reilly, 1999).

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